RESPONSE TO COMMENTS

Administrative History

On September 19, 2002, following the preparation of a preliminary draft permit by Department staff, the Board of Environmental Protection (Board) voted to assume jurisdiction of the general permit and ordered that a public hearing be held pursuant to Chapter 30 of the Department's rules, *Special Regulations for Hearing on Applications of Significant Public Interest*. During a meeting on November 7, 2002, the Board granted a total of 16 petitions for intervention in the hearing process. These 16 parties were then consolidated into four groups based on their general positions on the proposed general permit: 1) environmental interests; 2) industry interests; 3) municipal and county economic interests; and 4) a lobsterman's cooperative. The latter group subsequently withdrew from intervention and submitted no comments. On November 20, 2002, the Board held a pre-hearing conference in Augusta. At a meeting on January 2, 2003, the Board posted the proposed general permit to public hearing. Copies of the proposed general permit were made available to all intervenors and other interested parties pursuant to Chapter 522 of the Department's rules, NPDES *Application Processing Procedures.* Public notices of the hearings were published in the *Bangor Daily News* on January 7, and January 29, 2003, as well as in the *Ellsworth American* on January 16, 2003. Intervenors had until January 13, 2003 to submit pre-filed direct written testimony in consideration of the proposed general permit and until February 3, 2003 to submit written rebuttal testimony. On February 6, 2003, a public hearing was conducted in Machias for the purpose of receiving oral testimony from the general public. The public hearing continued on February 11 and 12, 2003 in Bangor for the purpose of receiving oral testimony from the intervenor parties and their witnesses. The record closed on February 13, 2003. Following the hearing in Bangor, the intervenor parties were provided an opportunity to file post-hearing briefs and reply briefs by March 5, and March 19, 2003, respectively. On March 10, 2003, the Board conducted a deliberative session. A revised version of the proposed general permit was circulated to interested persons on May 9, 2003, with the comment period closing on June 4, 2003.

Comments received during the hearing and subsequent comments are summarized below and are organized, where applicable, by the section of the proposed general permit. This is a summary of the full record and is intended to capture the significant comments received. The full record has been considered and utilized in preparation of the proposed general permit for Atlantic salmon aquaculture. Persons providing comments on the proposed permit were assigned an arbitrary number, which is referenced in each comment. The names and associations of the persons who provided comments are listed at the end of this document.

In addition to providing responses to specific comments, the Department has amended the general permit language in some areas to clarify the original intent or to support changes made in other related sections.

General Comments

1. Comment: Several persons commented on the significance of the finfish aquaculture industry in the State's economy. After lobster, salmon are the most valuable seafood landed in Maine and the payrolls as are significant, especially in Washington County where the general economy is depressed. However, the industry is under considerable pressure from foreign markets. These social and economic factors should be considered in determinations of best practicable treatment and the area of coverage for the general permit. (4, 14, 16, 18) It was also noted that facilities may move around over time leaving adverse impacts that may last for indefinite periods of time, making good monitoring important. (7)

Response 1: The Department notes and acknowledges the economic significance of aquaculture facilities. The record does not identify any BPT requirements that would constitute disproportionate economic impact on the industry. The BPT controls proposed in the permit, such as real-time control of feeding, are consistent with measures in EPA's draft effluent guidelines for concentrated aquatic animal feeding operations, including finfish aquaculture. Much of the monitoring required by the permit is presently conducted by the FAMP. Compliance with water quality standards and protection of uses does not rely on economic considerations in the same manner as do BPT determinations. In order for a permit to be issued, the Department must ensure that controls and provisions necessary to protect receiving water classification standards are used. However, the Department remains mindful of the cost of compliance and makes every effort to assist applicants in identifying the most efficient means to achieve statutory requirements.

2. Comment: Some persons expressed concern with the lack of bay-wide or regional planning and impact evaluation in permitting of aquaculture facilities. The general permit should be accompanied with a monitoring program to assess impacts in the bay or in other areas of the coast. The number of farms in an area should also be a consideration in the permitting process. The State should develop a bay management plan. (8, 9, 11, 41, 58)

Response 2: Bay-wide management, as applied to aquaculture, may be used to address two separate concerns: 1) control of fish diseases or parasites; or 2) limiting the number of facilities in an area to control pollutant loadings. The majority of comments received were more concerned with the cumulative impact of pollutants in an area of the coast. In this latter regard, nitrogen, the limiting nutrient in marine systems, is the most likely pollutant of concern. No definitive evidence was presented to document area-wide degradation of water quality as a result of existing aquaculture operations (see the discussion on "green slime" under comment 10). Identified impacts are limited to the area under or immediate adjacent to net pen systems. The primary concern is the potential adverse effects of new pollutant sources being added to existing ones. Section I.D.2 requires advance notice and site sampling and characterization for new facilities that intend to seek coverage under the general permit. Given this information and other general water quality data, the Department will conduct evaluations during the 90 days prior to the filing of a NOI for each new facility. This review will provide individual, site-specific and bay-level analysis of the proposed new discharge, in addition to existing point and non-point sources of pollutants, to determine that the State's anti-degradation policy is met. Predictive models for all Maine coastal waters are not currently available, and given the complexity of such

tools, they will not be available in the near future. As needed, the Department will use bay-level models to evaluate pollutant loads of concern from all sources to determine if a proposed aquaculture facility will significantly affect water quality. However, the Department believes that individual analysis of incremental increases is fully adequate for the purposes of this permit.

3. Comment: Several persons cited several reasons why the use of a general permit is not appropriate for Atlantic salmon aquaculture facilities and that individual permits should be required. The general permit provides too little opportunity for public review and comment. There is a need to protect site-specific resources and DMR's lease application review process does not provide adequate opportunity for various parties to participate. The differences between sites and facilities is too great to allow general coverage and permits must be tailored to unique local conditions. (6, 8, 9, 10, 24, 30, 31, 38, 53, 54, 56, 57, 58, 60) Conversely, it was pointed out that farms comply with all the criteria in the rule supporting general permits. Further, there is ample research on aquaculture farms in Maine to substantiate issuance of a general permit. (2) Finally, it was noted that issuance of individual permits would present a significant burden in terms of time and resources required. (62)

Response 3: The Department is confident that the general permit is an adequate and appropriate means to regulate the aquaculture industry. The statutory goal for all aquaculture facilities, whether regulated by a general or individual permit, is that, "[t]he project will not have a significant adverse effect on water quality or violate standards of the receiving water's classification." 38 MRSA, §413(10). This is, indeed, very close to the intended use of general permits in situations where discharges have, "a relatively low risk for significant environmental impact." Chapter 529, NPDES *General Permits*, summary statement. In making such judgement, one must consider the activity as it is regulated, not as it may have performed in the past. The Department generally agrees with comments that aquaculture facilities categorically meet the tests set forth in Chapter 529 for issuance of a general permit. These include the types of operating practices, nature of wastes, operating limitations, and monitoring requirements. All of these are very similar across the industry. All facilities must meet the same water quality standards within the same bounds. Further, since another state agency has previously regulated aquaculture facilities, there is substantial information available to assist the Department in evaluating facilities and their individual suitability for general permit coverage. Through various conditions, the general permit excludes situations or areas that pose risks for possible water quality impacts. Modifications have been made to the general permit in section I.D.4 requiring public notice for notices of intent being filed with the Department to ensure public participation. Consideration of applications for NPDES permit coverage, whether individual or general, is limited to the quality of the discharge and classification of the receiving water, and does not necessarily cover various siting issues that are examined by DMR in that agency's review of lease applications. The Department will consider findings of DMR and the Corps in its consideration of NOI's to determine if narrative water quality standards are protected.

4. Comment: The BEP should regard the conditions in Acadia's permit and the Heritage Consent Decree as the minimum standards and limitations in the general permit. (8) On rebuttal, concern was raised that some of the testing required by these two documents

would not be beneficial for regulatory purposes and would amount to more of a research project. (2) With some changes, the general permit is supported. (59)

Response 4: The Acadia Aquaculture permit was used as a model for the general permit in many sections. Due to concerns with flushing, parts of Blue Hill Bay, including the site of the proposed Acadia Aquaculture, have been excluded from general permit coverage. Since nutrient loading and flushing are not of significant concern in the areas covered by the general permit, these characteristics have not been included in the general permit siting criteria. The Department attempts to focus monitoring requirements on those parameters and locations that are most meaningful in evaluating facility performance and impacts. As with most NPDES permits, the general permit does contain provisions allowing the Department to require additional monitoring on a case-by-case basis as dictated by the results of initial testing.

5. Comment: The permit does not adequately protect water quality, including the benthos, from organic waste. The deposition of feces, feed and discarded equipment degrades benthic conditions. (8) Maine has not experienced the sorts of impacts seen elsewhere and concerns about major environmental problems are not founded. Problems that have occurred were caused by facility management and confined to the areas immediately adjacent to the pens. (2)

Response 5: This is a general comment that appears to be based, in part, on the past performance of some facilities. The permit seeks to prevent such problems by establishing performance standards and a defined mixing zone. As permitted, the discharge activities may not cause the types classification violations cited in the comment. The provisions, limits and monitoring requirements of the general permit must be judged by the conditions it will allow or prevent, not past performance prior to NPDES permitting.

6. Comment: Past FAMP monitoring does not demonstrate that salmon farming has only minor environmental impacts. Serious impacts from salmon farming on benthic and water quality remain and the limited and poorly designed FAMP monitoring has done little to dispel these concerns. FAMP does not monitor antibiotics or other drugs, pesticides, copper, zinc, oil, gasoline, or algae blooms. FAMP data are inconclusive and the FAMP report does not provide regulators with the tools or information necessary to assess whether local or regional water quality or benthic impacts are occurring from salmon farms. (8, 9)

Response 6: While the general permit recognizes the existence of the FAMP and relies on that program for methods, the general permit requirements must be considered on their own merits. The FAMP is presently under review and a draft report of an independent consultant's findings is included in the testimony. Modifications made to the general permit monitoring requirements included recommendations made in that report, along with other recommendations made in testimony. As indicated under section II.E.9, a "tiered" approach using benthic chemistry to supplement and trigger infaunal analysis is proposed. This will provide more opportunities for benthic evaluation using various tests.

7. Comment: Several persons expressed categorical opposition to finfish aquaculture because of unavoidable impacts and the risks posed. The State should avoid the mistakes that have been made in some other countries. (26, 27, 29, 43, 44)

Response 7: The Department must consider issuance of any permit based on the applicable laws and rules. The Legislature has established laws that allow aquaculture under certain circumstances, as it is a designated use of the waters and specific licensing standards are established. See 38 MRSA §465(B) and also 38 MRSA §413(10), which specifically addresses the criteria for permitting aquaculture. The purpose of the general permit is to ensure that any aquaculture facility covered by it can comply with applicable laws and rules.

8. Comment: Questions were raised about the need for water quality certifications of aquaculture permits and compliance with NEPA and CZM requirements. The draft permit does not include documentation to support assumptions made by DEP regarding fish density, mixing zones, toxic pollutants and spill reporting. (38)

Response 8: NEPA is a federal rather than a state requirement, and states administering the NPDES program under EPA authorization are not obligated to include NEPA in their considerations. The Department has included the State Planning Office, which is involved with the CZM program, in the distribution of the proposed general permit. That agency has not provided any comments. The issues listed have been discussed in the fact sheet accompanying the proposed permit, but comments did not identify specific concerns or deficiencies. In addition to the permit and fact sheet, the Departments files are part of the record in this matter.

9. Comment: The DEP should disclose the types of information available on operation and practices of aquaculture facilities to the public and make them mail or internet accessible. Record keeping requirements needed for program evaluation include cumulative impact analysis and should be made available for public viewing. (10)

Response 9: Except to the extent information is considered confidential by statute (typically as proprietary business information) all records, reports and other information held by the Department are public information. See 38 MRSA §414(6). The discharge monitoring reports for many point source discharges are currently available on the internet at EPA's "ECHO" site. The Department is presently developing programs to make more environmental information available on its web site.

10. Comment: Concerns were expressed that aquaculture is causing a "green slime" to occur at various locations and impairing uses, such as shellfishing. (39, 41, 70) DMR testified that a number of factors, such as climate change, could be contributing to changes in the predominance and distribution of species. The algae in question was present prior to the establishment of the aquaculture industry in Maine and noted that algae mats occur near off-shore islands, which may be 10 miles or more from any human activity. (2)

Response 10: Testimony offered evidence that the occurrence of green slime was documented in years prior to the significant development of the aquaculture industry. There is no information to demonstrate that the industry has caused or contributed to a worsening of these growths. The

Department will, of course, continue to monitor on-going studies in this area to determine if aquaculture or any other discharges needs further regulation to prevent contributing to harmful algal blooms.

Section I.B.2 Definition of "Atlantic salmon aquaculture facility"

11. Comment: Several persons suggested that the general permit should be limited to Atlantic salmon, with concerns that the proposed limits may not be applicable to other species. It was also noted that rainbow trout is not a native species and escaped aquaculture fish may have a negative impact on wild populations. (8, 10, 12, 60, 69) Oral and rebuttal testimony pointed out that the Department of Inland Fisheries and Wildlife has a pilot project to stock rainbow trout into tributary waters of the Gulf of Maine. (17, 70) DMR testified that it would be problematic to apply a single FCR or stocking density to all finfish species. (2) In further comments, some suggested coverage not be limited to Atlantic salmon. (75, 77, 78)

Response 11: The Department agrees that the general permit should be restricted to only Atlantic salmon. The large majority of exiting facilities presently rear Atlantic salmon. Individual applications for other species will allow consideration of any unique factors the may be involved, and at this time these would appear to be only a small number of requests in comparison to Atlantic salmon facilities.

Section I.B.4 Definition of "new facility"

12. Comment: All existing aquaculture facilities must be considered "new dischargers" to be consistent with the Clean Water Act. This would provide ample time for the public to review and comment on applications. (8)

Response 12: As used in the Clean Water Act and the Department's rules, Chapter 520 NPDES *Definitions*, a "new discharge" is applicable to aquaculture facilities. However, the term serves primarily to trigger certain application information in industrial categories and is not particularly meaningful in the context of this general permit. In any event, the term "new facility" is unique to the general permit and does not supercede "new discharger" to the extent it may be applied to aquaculture facilities.

Section I.C.1 Area of coverage

13. Comment: Several persons offered comments on the geographic area that may be appropriate for coverage under the general permit. It was suggested that all existing facilities should be granted coverage since all have participated in the FAMP, have undergone public review and have been found to be acceptable. (2, 59, 62, 76, 77,81) Concerns were raised for the protection of sensitive areas and traditional uses, including but not limited to sea bird islands, navigational corridors, scenic vistas, public parks, and historical areas. Roque Island was cited as an example of an ecologically important area. Sensitive areas should be subject to individual permit coverage. (6) The general permit should establish a kick-out threshold based on net pen size, density, and/or significant

contributor of a specific pollutant. (10) The general permit should not be a marine planning or zoning vehicle and must be restricted to water quality issues. (59)

Response 13: The Department does not believe that all existing facilities should be automatically granted general permit coverage. The objective of the general permit is to allow activities where the conditions for compliance are well-defined and the risk for adverse impacts is relatively low when permit conditions are adhered to. Physical factors in the general permit (e.g. stratification, current, net separation) are designed to do this. While some facilities may have operated satisfactorily, it is still prudent to retain individual review capability to determine on a case-by-case basis if site-specific risk factors may need more consideration or regulatory controls than are afforded by the general permit. For example, a shallow water depth and/or reduced separation to the sea floor may prompt a review of stocking density or monitoring requirements. This approach allows for an increased margin of safety.

The Department agrees with the goals and concerns in testimony regarding protection of unique or important uses surrounding Roque Island. The evidence offered did not make a compelling connection between what the general permit seeks to do – control the discharge of pollutants and protect water quality – and the possible impacts on sea bird habitants. The primary risk of water quality impact from aquaculture is to the sea floor, not to far-field water quality. To the extent that there may be any far-field water quality risks created, the record does not make any direct connection to terrestrial uses.

Concerns raised about adequate opportunity for site-specific reviews to examine ecological, cultural and conflicting land uses are beyond the scope of the NPDES program that must focus on the discharge of pollutants and their effect on water quality. The broader concerns are primarily siting issues, not waste discharge issues. To that extent, the DMR is charged by the Legislature to examine such impacts as part of the process of granting leases. The placement of net pen structures in the water must be viewed separately from the discharge of pollutants. By way of example, establishment of concentrated boat mooring areas or a concentration of commercial fishing activities might pose similar threats of intrusion on wild birds, but do not create discharges regulated by NPDES permits. The Department of Inland Fisheries and Wildlife, the State's Natural Areas Program, and Historic Preservation Commission cited in the testimony as having interest in protecting sensitive uses or areas were provided copies of the proposed general permit but did not offer any comments.

High quality waters are obviously a resource in all areas of the State, and the Department, of course, fully supports protection and improvement of water quality. However, the testimony received has not made a connection between regulated discharges and impairment of particular uses. Accordingly, there is no basis to require the exclusion of Class SB waters surrounding Roque Island.

The testimony suggesting that the general permit should exclude certain aquaculture facilities did not provide any criteria for doing so, or provide any particular adverse consequences that may result from not doing so. Criteria identified as possibly affecting water quality have been addressed separately in the general permit.

14. Comment: Due to differences in mixing, stratification and flushing, existing data mandates that the applicable coverage area be restricted to areas east of Petite Manan Point or Great Wass Island with the understanding that some sites may still be inappropriate or require an individual permit. All sites west of this line should be required to apply for an individual permit that considers mixing and DO levels. (11, 61) Alternatively, it was suggested that the line for coverage be set at Libby Island. (60) On rebuttal, it was suggested that the oceanographic information cited by (11) does not support relocation of the line for coverage as proposed. The area of coverage coincides with the eastern Maine coastal current, which provides great flushing. (2)

Response 14: The general permit area of coverage should include those waters having characteristics that will reduce the risk of adverse impacts. However, within any defined area, less desirable conditions may exist and more specific limitations may be appropriate in addition to geographic boundaries. No single characteristic will ensure risk-free placement of a facility. Attempting to do so will result in conditions that unnecessarily restrict the general permit's coverage and utility. The geographic area is the "big picture" with other more local factors bringing it into sharper focus to protect water quality. Similar to the considerations originally used by the Department, the testimony emphasized flushing and stratification as significant factors in defining acceptable locations for permitting of aquaculture facilities. Related to these characteristics is the testimony on current velocity in section I.C.3 below.

The Department believes that wide-area current patterns and their resulting flushing rates are the most important characteristics to establish the general permit area of coverage. As presented in the testimony, the eastern Maine coastal current (EMCC) runs westerly along the coast to approximately Penobscot Bay. The exact track varies from year to year. As discussed in oral testimony, the great natural surplus of nutrients associated with the EMCC makes the contribution of nutrients from aquaculture or other anthropogenic sources a minimal risk to water quality. Because nutrients have the most potential for wide-area impacts from aquaculture activities, it is appropriate to design the permit coverage based on this consideration. Other potential impacts, such as dissolved oxygen or benthic impacts are localized risks that can be addressed through individual siting criteria or operating limitations.

To establish an area of coverage, the originally proposed dividing line remains a reasonable reflection of the EMCC's most predominate influence. Within this area, other factors still need to be evaluated using independent criteria that are more site-specific. To address concerns about dissolved oxygen, a new subsection on stratification has been added to the general permit, and is further discussed under comments for section I.C.3 below.

Section I.C.1 Stocking density

15. Comment: It was suggested that the permit should limit stocking density to a maximum of 18 kg/M^3, primarily as a means to reduce the incidence of disease. (8, 60, 82) Another person had not seen any convincing evidence that stocking densities below 25 kg/M^3 are related to incidence of disease. A third person noted that a Norwegian study identified 22 kg/M^3 as the point where the FCR increases and growth declines in farmed salmon. (55, 62) Others urged that a cap be set, but did not offer recommended values. (30, 38, 42, 57)

Finally, it was argued that the stocking density be reported, but not limited, noting that several other factors contribute to the risk of disease and environmental impact. No other countries have enforceable density standards. (2, 81)

Response 15: The Department agrees that, based on the information received, there is no universally accepted purpose or values for regulating the stocking density. However, density is an important consideration for fish health and potential benthic impacts. The Department is retaining the reporting requirement both as information in applications and to collect information that can be evaluated against facility performance over time. This latter use may enable establishment of numeric values for density in the future. The Department acknowledges that other agencies (e.g. DMR or USDA) concerned with fish health may independently set density limitations as and where needed to control diseases. Maine has a Fish Health Technical Committee consisting of the Maine Departments of Agriculture, Marine Resources, and Inland Fisheries and Wildlife, the US Department of Agriculture, the US Fish and Wildlife Service, the National Marine Fisheries Service, academia and industry representatives. For clarity, the density language has been removed from the area of coverage and placed in a separate new subsection, I.C.6.

Section I.C.3 Current velocity

16. Comment: It was pointed out that the method proposed in the general permit for calculating average current velocity is not consistent with the method used by DMR. (1, 2) The use of current and water depth are good predictors of environmental risk. (2) Others stated that the use of current readings over one tidal cycle produce values that are too low and do not account for factors such as eddy currents that reduce bay-wide mixing. (7, 11)

Response 16: Changes have been made in the language to include the entire tidal cycle in the calculation of average current velocity and to clarify the methods for determining current velocity, as proposed in the testimony. The Department intends that "representative oceanographic conditions" will not include periods of spring tide, storm events or unusual events that would result in higher than normal current velocities.

17. Comment: Some persons did not believe that the proposed minimum average current velocity of 5 cm/sec was sufficient to assure good flushing and prevent water quality degradation. The basis for the value is not supported. Aquaculture sites must be well-mixed vertically in order to prevent stratification, which can lead to dissolved oxygen depression. Another criterion to use is the Simpson-Hunter formula, as it better describes mixing. A value of less than 100 $m^{-2}sec^{-3}$ is an appropriate level for coverage under the general permit. (9, 11, 60) On rebuttal, the use of average current velocity was defended, noting it is used in other jurisdictions. The Simpson-Hunter criterion may be useful in the future, but currently relies on extrapolation of data from offshore measurements. Some sites predicted to stratify did not, based on actual measurements. (2, 59) Finally, the operator of one aquaculture facility noted that application of the Simpson-Hunter criterion at his site would suggest serious non-compliance conditions that have not occurred in practice. (55)

Response: See below

18. Comment: The permit should rely on performance-based metrics to prevent the accumulation of waste on the sea floor. Average tidal velocity does not resuspend larger particles as well as peak velocity does (Stoke's Law). The average current velocity requirement should be removed from the permit, but can be included in the characterization process for new sites. The placement of nets may cause the current to increase beneath them. (18, 19, 62) This position was opposed by others, noting there is linkage between current and re-suspension of particles in the Gulf of Maine. A higher velocity should be specified since placement of nets can reduce the current under nets. (7, 9, 11) Subsequent comments suggested that the numeric velocity criterion be dropped. (76, 81) Some thought that stratification is not needed as a siting criterion. (76)

Response 17 & 18: Comments received on this section of the general permit raise two separate issues: horizontal and vertical mixing. Horizontal velocity is important to disperse settleable materials and prevent accumulation on the sea floor beneath and adjacent to the net pens in amounts that would degrade benthic conditions. Vertical mixing is important to avoid stratification of the water column that may result in depressed DO levels in the lower strata. Both conditions may cause unacceptable impacts and are to be avoided. Each of these siting criteria should be considered separately.

With regard to horizontal velocity, some testimony urged that the current velocity limit should be dropped as a siting criterion for general permit coverage. Others suggested that the proposed limit of 5 cm/sec should be increased since the placement of net pens reduces the current below the pens. Conversely, it was suggested that net pens may funnel water below them and increase the velocity. Evidence on the record did not conclusively demonstrate either hypothesis. However, the Department does believe that horizontal mixing is one useful determinate in establishing general permit coverage. As pointed out in testimony, the proposed limit of 5 cm/sec is within the range used by other jurisdictions. In oral testimony, Department staff noted that a review of aquaculture sites having recent benthic compliance concerns suggests a relationship with a breakpoint of 5 cm/sec. While this is not conclusive, such empirical information does suggest that the proposed limit of 5 cm/m is in the appropriate range.

With regard to vertical mixing, the use of the Simpson-Hunter criterion has been proposed as a means to predict areas where the water column would stratify. The Department agrees that aquaculture facilities should not be located in stratified water without careful individual permit review. However, uncertainties regarding the ability of the Simpson-Hunter criterion to accurately estimate stratification near-shore suggest that it is not an appropriate siting criterion. As pointed out in rebuttal testimony, the criterion is most useful for regional, deep-water applications, and is intended to identify regions that may stratify, but not necessarily specific locations. Near-coast waters where aquaculture facilities are located are shallower and more turbulent, with local conditions being important factors in determining whether or not stratification will occur. Testimony pointed out that there is considerable monitoring information at aquaculture sites that does not identify any stratification where the Simpson-Hunter criterion predicted it would occur. The trigger value of 100 $m^{-2}sec^{-3}$ appears to be based, in part, on interpretation of experimental data from other areas. The value may be beneficial as a

predictive tool, but more information specific to near-coast locations in Maine should be collected and evaluated before a firm value is established for regulatory purposes.

The Department does, however, recognize that stratification is an important issue that should not be ignored. Accordingly, a new paragraph in this section of the general permit has been added. This requires the Department, as part of reviewing NOIs for general permit coverage, to evaluate site data for evidence of stratification. Data developed from baseline studies, FAMP monitoring, monitoring under the general permit and other information about area-wide conditions will be considered. The presence of significant, persistent stratification during summer months would justify denial of general permit coverage. This evaluation is conducted by reviewing site-specific data for temperature and density gradients vertically in the water column. A sharp temperature or density change with depth (e.g. 1^{o} C per meter of depth or a density change of 2 kg/m^3 over the total depth) is considered indicative of stratification. Of equal importance is the duration over which the condition persists. Transient, intermittent or weak episodes of stratification may not be significant predictors of possible water quality impact or reasons for exclusion from general permit coverage. Staff review of each application and site characteristics is an appropriate means to make these determinations.

Section I.C.4 Other permits required

19. Comment: The language should be amended to be consistent with DMR rules, which allow issuance of a permit that is conditioned upon receipt of a MEPDES permit. The permitting processes of DMR, DEP and the Corps should be coordinated. (2, 59)

Response 19: The Department's intent is to avoid conflicting or compounding permitting requirements between agencies. The language in this section has been changed from "To be covered by" to "To operate under this General Permit…"

Section I.C.5 Participation in other programs

20. Comment: There is a concern that the general permit may create additional and separate monitoring from the FAMP. The permit requirements and the FAMP program should be merged to avoid differing requirements. (2) In rebuttal, this suggestion was opposed on the basis that the FAMP is limited and poorly designed. Also, the Clean Water Act requires that DEP alone administer the delegated program and the FAMP should be modified to conform with the permit conditions. (8)

Response 20: The Department will maximize coordination between state programs. The monitoring conditions in the proposed draft were aligned with the FAMP. The general permit does, however, contain a re-opener clause to allow modifications based on changes in the FAMP. It is noted that the FAMP is presently undergoing review and some changes in the permit reflect recommendations contained in the consultant's draft report. Under the Clean Water Act, the Department must retain independent authority to meet its monitoring obligations and objectives, and cannot delegate its responsibility to do so to DMR.

Section I.D.2 New facilities

21. Comment: A consolidated application for the general permit and a lease from DMR should be created. (2) The general permit area of coverage should not be available to new facilities. (76)

Response 21: The Department agrees that consolidation is important to make state regulatory processes as seamless as possible. The Department has and will continue to work with DMR at the administrative level to coordinate forms, notices, hearing procedures, etc. to the extent possible. The Department sees no reason why new facilities that are qualified under the general permit should not receive consideration. The special provisions in this section will provide the information necessary to conduct pre-operational evaluations.

22. The terms used to describe impact in this section and other parts of the permit are inconsistent and should be more standard (e.g. "significant lowering", "unacceptable impact" and "significant adverse impact.") (7)

Response 22: The Department agrees that the terms used in the proposed general permit are inconsistent, although the intent and purpose of the terminology are similar. The most applicable standard to measure how aquaculture activities influence water quality is "significant adverse effect," since this phrase is used in the statute directly pertaining to licensing of these facilities. 38 MRSA §413(10). The other terms in the permit have been replaced with this language to remain consistent. In section I.D.2 of the permit, the phrase "significant lowering of water quality" is based on the State's applicable anti-degradation policy. For all practical purposes, the Department interprets "significant lowering of water quality" as having the same basic meaning as "no significant adverse effect."

Section I.D.3 Contents of a Notice of Intent

23. Comment: The NOI should require a facility to list all chemicals that are used, including metals and drugs. A facility should have to modify its NOI before using anything not previously specified. (8) This was questioned, noting that the aquaculture has a very limited list of chemicals that are available for disease control, and these are well known to regulators and is redundant with section II.L. (2, 85) Others stated that listing all drugs is too broad (33, 46) and FDA programs should be relied upon. The term "drug" is not adequately defined. (33) Compliance with advance notice requirements for drug use would not be possible. (17) The amount of detail regarding feed composition and reporting is not defined. (77)

Response 23: All drugs a facility might discharge to waters of the State are to be identified in the NOI. The proposed general permit omitted information regarding the amount and composition of fish feed to be used. This has been added. The Department encourages facilities to be comprehensive in completing their NOIs to include compounds or activities that may be used in the future to provide full advance disclosure and to minimize the need for filing amended NOIs. Pollutants not listed in a NOI may not be discharged. The Department's intent is for the term "drug" to be used with the normal and customary meaning, to include compounds used to

treat diseases or parasites in the operation of aquaculture facilities. Comments regarding notice for the use of drugs are discussed under section II.L. As to trace ingredients, the Department is expecting that facilities will provide a complete analysis of feed used, including additives such as vitamins, nutrients, supplements, etc. The Department intends to gather information on feeding rates using the maximum quantity of feed used on an annual basis.

Section I.D.4 Filing of a NOI

24. Comment: All lease applications should be made available for public comment and local input. (40) The permit should be changed to require publication of a public notice prior to the filing of a NOI. (1) This was supported for existing facilities, but seen as unnecessary for new facilities since the lease approval process provides ample opportunity for public comment and a unified application process. (2)

Response 24: Changes have been made to this section to provide for the public notice of NOIs to be filed with the Department. Administratively, the Department intends to work with DMR to consolidate notice requirements and share administrative records. NOIs must be filed at municipal offices as well, increasing their availability to the public. Monitoring information is available through the Department and DMR.

Section I.D.5 Review of a NOI and other information

25. Comment: The language should be amended to include DEP along with DMR to demonstrate that the FAMP is a joint program. (2)

Response 25: The FAMP is, by law, administered by the DMR. The Department appreciates the continuing opportunity to participate in reviews of the FAMP and share information. That information will be an important part of the record that is considered as NOI and monitoring information is considered by the Department. Further, the Department routinely seeks input from other state and federal agencies during the review of permit applications without formal joint programs in place.

Section I.E.2 Individual permit coverage

26. The permit should include a mechanism for citizens to petition to the DEP to require a facility authorized under the general permit to apply for and obtain an individual permit. (10) Concern was expressed that interested persons requesting revocation of coverage could result in harassment of facilities. (80) The close proximity to a salmon river should be a factor for determining that a facility is a significant contributor of pollutants. No facilities should be permitted within 20 km of a salmon river. (8)

Response 26: The intent of the present language (“an interested party may request”) in this section is to allow citizens to ask that the Department review a facility for possible exclusion from general permit coverage. The reasons for such requests must be those listed in the general permit. Public requests for review under this provision do not obligate the Department to any specific action, although the Department is committed to investigating and responding to citizen

inquiries. The proximity to certain rivers has not been cited by the Services as a present concern with regard to the protection of Atlantic salmon.

Section II.A General Limitations

27. Comment: The permit must prohibit the use of any unnecessary chemicals or drugs and require monitoring to ensure that there is no risk to marine organisms or public health. (20, 24, 28, 30, 37, 41, 45, 53, 54, 57) The allowable use of a fish flesh dye, canthaxanthin, should be reduced by two-thirds and the use of formaldehyde and formic acid should be entirely prohibited due to possible effects on human health. (42) Amend this section to provide that even incidental discharges of anti-foulants are limited or prohibited if detected in the water column, sediment or organisms. (8)

Response 27: The Department agrees that the discharge of drugs or any other substances that are not necessary should be avoided. In its approval of drugs, the FDA considers both human health and environmental impacts, and when these are used as directed on the label should be safe. A further discussion of drug use may be found under section II.L. Canthaxanthin was cited in testimony as having possible human health effects. The FDA has regulatory authority over the additives used in feed for salmon reared for human consumption. Testimony indicated that formalin (the aqueous form of formaldehyde) is the active ingredient of some FDA approved drugs. Although these have not been commonly used in Maine, they may be from time to time. The Department is not aware of any discharges of formic acid from aquaculture facilities in Maine. Any proposed discharges would be evaluated for aquatic toxicity before being allowed. In general, the permit prohibits the discharge of chemicals except incidental discharges in conjunction with good management practices. For example, the dumping of a container of chemical such as formic acid would be an unlicensed discharge of pollutants and, therefore, prohibited under State law. The Department expects that anti-fouling chemicals leaching from net coatings, etc. would do so at a low rate and that the sediment would be the most probable location for the accumulation of metals and the best indicator of cumulative impacts. Thus, monitoring is required under the permit.

Section II.B Feeding rates and monitoring

28. Comment: The proposed Food Conversion Ratio does not accurately represent current technology and reports from Europe and Canada, which may make it inconsistent with farms in other states or countries. The FCR should be reduced to 1.1 to reflect current technology and overseas industry standards. (9, 60) Rebuttal comments: Reducing the FCR to 1.1 is inappropriate due to the lack of a clear and standard definition or understanding of FCR (i.e. biological vs. economical FCR) and a maximum FCR should not be imposed. (20) Characterization of testimony regarding European and Canadian FCR rates is misleading. (16)

Response: See below

29. Comment: There are more effective and direct ways to minimize impacts associated with feeding and the permit should not include a maximum FCR. (2) Other jurisdictions do not

include an FCR limit. An FCR limit is difficult to enforce since the general permit allows no "significant" accumulation of feed on bottom, but it is difficult to decipher feed from feces based on video monitoring. An FCR requirement is duplicative since monitoring the effects of net pens on the water column and the bottom conditions would allow facilities to quickly modify feeding rates to improve water conditions. A pre-determined arbitrary cap may be disincentive to innovate and an FRC limit of 1.3 would remove the management option of marketing larger fish. A report only requirement rather than a numerical limit should be imposed. (16, 18, 19, 62) Rebuttal comments: An FCR of 1.3 *may* rather than *would* eliminate the option of marketing larger fish is a more precise statement and the argument that differentiating between feed and feces on the ocean floor is not necessary. (2) The assertion that the FCR limit is duplicative is only true if the provisions requiring impact threshold and enforcement limits for water column and bottom conditions are adequate. Retain the proposed FCR limit in the permit. (9, 11)

Response 28 & 29: The FCR was originally proposed to regulate the amount of feed used over a growing cycle as a means of limiting the risk of benthic impact and was intended as a means to evaluate best management practices for feeding. This would control the discharge of pollutants as opposed to monitoring their effects on the sea floor. The Department continues to believe that pollutant control is the preferable means of maintaining water quality. However, uncertainties about the most appropriate FCR value and means for measurement in all circumstances are valid concerns when setting a regulatory limit. Accordingly, the general permit has been modified to remove the FCR limit in favor of a "report only" requirement. Language has been added to clarify the method to calculate the FCR. The Department intends the calculations to be based on the live weight of fish removed from the pens either through mortality, conversion to broodstock, or harvest over the total time a year class of fish are in net pens. Because fish maintained in separate pens as broodstock are a relatively small number and are kept on-site for longer periods of time, they need not be included in FCR calculations. Finally, the language has been modified to allow facilities to calculate their FCR using conversion factors for the difference between live and processed weight.

30. Comment: The term "significant" is not defined as it applies to accumulation of unconsumed feed on the sea floor. (17)

Response 30: Environmental laws, rules and permits often use this or similar subjective terms to judge performance of various activities. As applied here, significant accumulation would be deposition of uneaten feed at a rate clearly greater than natural decomposition can assimilate the feed over a period of time. However, site-specific judgement must be applied to recognize individual circumstances. The Department expects that video monitoring will demonstrate quite graphically when excessive accumulation of uneaten feed occurs.

<u>Section II.C</u> Mixing zones

31. Comment: Too large a mixing zone would allow private appropriation of a public resource and the entire mixing zone should be located within the boundaries of the DMR lease. The zone should be minimized to the greatest extent technically feasible and if farms cannot meet a 5-meter standard, they should not be granted a general permit. (7, 8) The size of the

mixing zone should be based on scientifically defensible studies. (8, 9) There is no legal basis or justification for the proposed 30-meter zone, which is significantly larger than the 5-meter zone established in the EPA's permit for the Acadia farm. (11, 60) Rebuttal comments: The Clean Water Act provides an opportunity for initial dilution of wastes and EPA has applied mixing zones in their water quality standards. The 30-meter zone was calculated based on an existing EPA formula of 2.5 times the total water depth, but uses only a surface layer depth, typically 2.5 meters in Maine, and not the total depth. (2)

Response 31: The authority for establishing a mixing zone is at 38 MRSA §451, and is a subjective standard. A mixing zone is intended to "allow a reasonable opportunity for dilution, diffusion or mixture of pollutants with the receiving waters before the receiving waters below or surrounding a discharge will be tested for classification violations." In consideration of what is reasonable, several factors are to be considered: the nature and rate of the discharge, the nature and rate of mixing, the size of the waterway, seasonal or climatic changes and uses of the water way.

The Department believes that the mixing zone as described in the proposed general permit is reasonable. While some lowering of normal standards is allowed within that area, they do not permit unchecked degradation, nor are the waters rendered unsuitable to support any uses. The 30-meter zone is comparatively small in a marine setting and most of the anticipated effects are temporary or transient. Several comments were concerned with the water column in particular. In that area, depression of DO levels would be due primarily to the respiration of fish being reared in and organisms growing on the nets, and not caused by a traditional discharge of pollutants that would exert a continuing oxygen demand. In any event, the water column standards in the mixing zone are sufficient to avoid any loss of normal or expected uses. The drift time through the 30-meter water column mixing zone at a current velocity of 5 cm/sec is 10 minutes.

32. Comment: The mixing zone must consider horizontal movement of pens from tidal action. (38)

Response 32: Language in this section is intended to address such a concern by referencing the mixing zone to the perimeter of the net pens. Due to horizontal currents, benthic deposition may be offset from directly under the pen as a shadow effect. In such situations, the general permit would allow the mixing zone to be re-oriented, although the total area could not be any larger than the area of the net pens plus the 30-meter perimeter.

<u>Section II.D</u> Narrative limitations

33. Comment: Narrative limitations are not accompanied by specific thresholds or criteria that would make monitoring and enforcement possible. Methods and protocols needed to establish cause and effect relationships have not been developed or defined. Include specific thresholds for all parameters. (9) Prohibition on discharging suspended or settleable solids that will adversely affect the resources… is broad, not attainable within the mixing zone and is an oversight since "Impact Thresholds" section allows some degree of

benthic impact. Amend this section to reflect allowable impact threshold described in Section II.G. (19)

Response 33: Items 1-3 in this section are drawn largely from narrative conditions in Maine law. The statute does not provide further detail, but leaves assessment of incidents for the Department to evaluate on a case-by-case basis, considering the degree to which uses are impaired in each situation. These statutory conditions are routinely included in NPDES permits and, in any event, apply to all discharge activities whether or not they are enumerated in NPDES permits.

34. Comment: Terms are unenforceable unless toxicity testing is added to the permit. Include appropriate toxicity testing, as was required in EPA's Acadia permit. (8)

Response 34: EPA's Acadia permit does not contain toxicity testing. Its regulation of toxicity is limited to narrative language similar to that in the proposed general permit. In both state and federal law, the underlying principle for the control of toxics is no discharge of toxics in toxic amounts. This is implemented through Chapter 530.5 of the Department's rules, the *Surface Water Toxics Control Program*, and is applicable to all discharges, including those from aquaculture facilities.

35. Comment: The terms "aquatic life", "hazardous" and "toxic" are not defined in the general permit. Medications could be considered to be toxic. (17, 80)

Response 35: "Aquatic life" is defined at 38 MRSA, section 466. The latter two terms are defined in Chapter 520 section 2 of the Department's rules, NPDES *Definitions*.

Section II.D.4 Narrative limitations for suspended and settleable solids

36. Comment: The prohibition on discharging suspended or settleable solids that will adversely affect the resources is broad, not attainable within the mixing zone and is an oversight since Section II.G *"Impact Thresholds"* allows some degree of benthic impact. Modify the language in this section to "…except as authorized by Section II.G. *Impact Thresholds*." (19, 62)

Response 36: The first paragraph of this section states that the standards are applicable *beyond* the mixing zone. Therefore, further qualification, while not incorrect in intent, is unneeded and may prove confusing to some. The standards in section II.G pertain to conditions *within* the mixing zone and are independent of this section.

Section II.D.5 Harmful algae blooms

37. Comment: The DEP has not justified limiting this section to "harmful algae blooms" and the proposed language does not specify how this will be determined. Specify the type of harmful algae blooms and what procedure will be used to verify type of bloom and link to facility. (7) The connection between harmful algae blooms and facilities is not clear and there is no documented link. (78, 80)

Response 37: Similar to other narrative conditions, the degree of impact and appropriate actions are subject to the Department's enforcement discretion. Where harmful algae do occur, the State must demonstrate that a particular source contributed to the situation. To clarify this section, the Department has added, by way of example, types of algae that may be considered harmful if present in overly abundant amounts.

Section II.E.1 Levels of monitoring and general requirements

38. Comment: The permit should not mandate unnecessary or scientifically useless monitoring and testing, and farms should have the option of reducing monitoring to Level I if they have demonstrated that it is not approaching the oxygen standard. (2) Rebuttal comments: DO sampling should be increased to once per week during June through October based on GOMOOS data. (11)

Response 38: The Department agrees that monitoring should be focused on measuring meaningful parameters to evaluate environmental performance of regulated activities. However, a certain minimum core of relevant monitoring and frequencies must be conducted to ensure that variations due to operational or environmental changes are reasonably represented. Dissolved oxygen monitoring is discussed in section II.E.6 below.

Section II.E.2 Sampling information

39. Comment: Require specification of the brand and model of all instruments used, the method and date of the most recent calibration and the entity performing calibration. (11) Rebuttal comments: Section III of the permit incorporates Chapter 523, NPDES *Permit Conditions* requirements on test procedures. (2)

Response 39: As the Department noted in testimony, Department rule Chapter 523 addresses acceptable test methods. Any brand of equipment that uses the proper methods and can attain required quality assurance standards is acceptable.

40. Comment: Magnetic north changes position, is not used by most scientific studies and should be replaced with true north. (7) The value of this was questioned. (78)

Response 40: This section has been amended to specify the use of true North to allow standardization over time.

41. Comment: Mean low water may be difficult to cross-reference with new NOAA charts and may not provide consistent data and should be changed to NOAA's updated Mean Lower Low Water. (7, 82)

Response 41: Much of the existing monitoring and site information is expressed as mean low water. To avoid confusion in the use of these data and to maintain uniformity, mean low water is being retained in the general permit.

Section II.E.3 Modification of monitoring requirements

42. Comment: Amend the last sentence of this section by including the DEP along with DMR and a clause that changes shall be considered "minor and technical in nature" and subject to comment. (2, 77) Rebuttal comments: Regarding all future FAMP monitoring modifications as "minor and technical" is absurd and shows contempt for public input and violates State and federal regulations. (8)

Response 42: Under the State's NPDES program, most permit modifications are subject to public notice, comment and opportunity for hearing. Only in limited situations, such as correction of errors, can the Department make permit revisions without notice being provided. Maine law does not define "minor and technical in nature" nor does it establish an exemption or specific administrative process.

Section II.E.4 Baseline monitoring

43. Comment: Require baseline studies of pen sites to identify the potential for the natural generation of methane and/or hydrogen sulfide. A general permit should not be granted in the case where studies identify the presence of pock marks or evidence of spontaneous outgassing. (7)

Response 43: The Department agrees that evidence of out-gassing is a relevant consideration and has added this observation, along with sulfide, to the baseline monitoring. However, evidence of out-gassing alone may not be grounds to categorically exclude a site. Review of new sites should be performed in consideration of all available information. In the cases of out-gassing, isolated pockets may not be representative of the site as a whole, although wide spread out-gassing would likely be cause to reject general permit coverage. Case-by-case review of sites using best professional judgement is the appropriate means to evaluate new sites. In order to support statistical evaluation of monitoring data, language has been added to require at least three baseline samples for each bottom type at the facility's location.

44. Comment: Without baseline data on sediment toxicity, the DEP cannot ensure compliance. Limiting testing to copper and zinc severely limits the ability to determine the cause of species richness or abundance. Require a tiered test system when threshold values are reached and routine testing for certain chemistry. (7, 60) Rebuttal comments: A benthic community analysis accomplishes this. (2)

Response 44: The Department agrees that an analysis of the natural infauna is a very good indicator of a site's ecological condition. The tiered approach to benthic monitoring is discussed in section II.E.9 below.

45. Comment: The nutrients phosphorus, ammonia nitrogen, nitrate nitrogen and nitrite nitrogen could be a problem in embayments with poor flushing characteristics and should be monitored. DEP should model flushing to justify that no monitoring is necessary. (7, 82)

Response 45: As discussed under section I.C.1, the Department does not believe that facilities covered by the general permit will be significant contributors of nutrients to the waters in the

area of coverage. For new facilities, if baseline information suggests that a proposed site may be nutrient limited (through modeling or other evaluations), the Department would require an individual permit.

Section II.E.6 and 7 Water column monitoring requirements

46. Comment: Not including an 85% DO standard weakens the permit and a report only requirement may allow for violations of water quality standards. Amend this section to require minimum DO levels of 7 mg/L and 5 mg/L for cold-water and warm-water fish, respectively, and a DO saturation standard of 85%, as required in the EPA's Acadia permit. (11, 82) Rebuttal comments: The requirement to meet the DO percent saturation does not apply within the mixing zone. EPA's Acadia permit intended the concentration standard of 6 mg/L to apply within the mixing zone and the percent saturation to apply beyond. (1)

Response: See below

47. Comment: Dissolved oxygen levels of 6 mg/L under pens and salinity of 30 ppt calculates to 67% saturation (at 12 degrees C.) and does not even meet standards for Class SC. Even at the recommended 7 mg/L, saturation is 69% just outside the 30-meter mixing zone. (11) Rebuttal comments: Saturation is dependent on water temperature and the calculations reported used a water temperature of 12 degrees C., which may not be representative of conditions in Maine during the critical period of late summer and early fall. At a representative temperature of 15 degrees C., the class SC saturation standard is achieved. (1)

Response 46 & 47: As pointed out in rebuttal testimony, the general permit is consistent with EPA's Acadia permit in that percent saturation of dissolved oxygen does not apply within the mixing zone. The Department believes that 6 mg/L of dissolved oxygen is fully adequate to protect designated uses within the mixing zone, and as noted in testimony, is consistent with levels required in some other states.

48. Comment: Loadings from aquaculture facilities can be very significant contributions of nutrients in some areas. Far-field water column monitoring should be expanded to include nitrite, nitrate and ammonia. (9, 42, 60, 82) Conversely, it was pointed out that contributions from aquaculture are a very small part of the overall nutrient balance in Maine waters and monitoring is not a productive use of resources. (59)

Response 48: The Department agrees with testimony regarding relative contributions of nutrients from aquaculture in the general permit area of coverage. While aquaculture facilities do discharge amounts of nitrogen that are comparable to municipal or industrial sources, this quantity must be put in perspective with natural loadings, which are much greater, and flushing rates.

49. Comment: Near-field and far-field sampling periods should be longer to capture trends in seasonal variation, and monitoring reports should be submitted within 30 days of the monitoring event. Increase the monitoring frequency. (9, 60, 82) Once per year sampling

is adequate. (77) Reduced testing should not be allowed and profiles should be done. (82) Most dissolved oxygen issues are due to dirty nets. (84)

Response 49: The Department agrees that it is prudent to extend the monitoring period through October and to conduct additional testing.

For the near-field monitoring, the Department has increased the monitoring frequencies to twice per month for Level I and weekly for Level II. This will allow a sound monitoring record to be developed at each site. A new section II.E.6.e has been added under which the Department may reduce monitoring after two years for facilities that have demonstrated good compliance. Over a number of years, the aggregate of FAMP sampling has shown a high percentage of measurements in compliance with water quality standards. However, a structured sampling program over the expanded sampling season is prudent to verify compliance at each facility under various conditions. Language has been added to II.E.6.d to connect near-field results with the need to monitor at the far-field location. In the event that the near-field percent saturation is below 85% for Class SB waters or 70% for Class SC waters, monitoring should be conducted at the far-field location to determine if classification violations may be occurring. Profiles at the near field location are not needed since dissolved oxygen reductions are due primarily to respiration and the mid pen depth is the most important point to detect this condition.

For the far-field monitoring, the Department has not made any changes to the monitoring frequency, but has adjusted the Level II monitoring time from July and August to August and September to better capture the most critical times for low DO levels. As noted above, additional monitoring would be required when percent saturation levels at the near-field site suggest possible non-compliance.

50. Comment: Large DO fluctuations can occur over several days to a week and may be at their minimum in October. Due to stratification of the marine waters, the proposed sampling methods may not accurately reflect measurements of DO, temperature and salinity. A continuous profile sampling method was recommended from June 1 through October 31 of each year. (7, 11)

Response 50: While the Department does not believe that stratification is a significant issue in locations within the coverage area of the general permit, collection of some vertical profile information may be useful to confirm that such conditions do not develop. The FAMP presently conducts profiles in its monitoring. To parallel this where possible, the far-field monitoring has been modified to require profiles be conducted at that location, as that represents the location where all classification standards must be met. Within the mixing zone, the tri-level monitoring requirement, especially monitoring at the mid-pen level, should be adequate to measure near-field impacts.

<u>Section II.E.6(b) and 7(b)</u> Near-field and far-field sampling methods

51. Comment: Diurnal oxygen fluctuations are minimal along the Maine coast; therefore, the before 9AM measurement requirement for DO is not necessary. Remove the 9AM

requirement. (2) Rebuttal comments: GOMOOS data shows that oxygen levels changed 3 mg/L over a period of several hours and therefore the proposed DO sampling requirements should be retained. (11)

Response 51: The Department agrees that the sampling time should be retained. Environmental sampling is always improved by standardization, and removing or controlling variables. With a uniform sampling time, possible diurnal changes can be avoided and results can be more readily compared from event-to-event and site-to-site.

Section II.E.6(a), 7(a), 8(a), 9(a) Sampling locations

52. Comment: Locations are not defined relative to the perimeter of the pen. Reduce subjectivity by not allowing sampling location to be left to the judgement of each sampler. Other jurisdictions use a set interval approach for sampling stations along transects for monitoring effects, which provides a better data set. Require sampling at a specified numeric distance from the outside perimeter of the furthest downstream pen. Establish simple and clear perimeter designations around pens and relate sampling locations to the perimeter with key locations noted up and downstream. (18, 19) Sampling at five meters from the net pens is too close. (81)

Response 52: The Department agrees that sampling locations should be specified. For the near-field water column, the general permit has been changed to require routine sampling at a point within 5 meters down-current from the net pens. This location has been used as part of the FAMP program. The far-field location is set at approximately 30 meters down-current from the net pens. It is noted that additional sampling may be conducted by either the facility or the Department in order to more fully characterize water quality conditions.

53. Comment: Using ellipse criteria eliminates interference and false reporting. Require the location of reference sites to be underneath water column reference sites, where possible, and to be located based on tidal ellipse criteria and be no closer than 100 meters to nearest fish pen. (11)

Response 53: This topic is addressed under section II.F.

Section II.E.8 Video and photography monitoring requirements

54. Comment: Monitor seasonal changes in bottom conditions and consider using a remotely operated vehicle for deep water sites. Require video monitoring during spring. (11, 82)

Response 54: The Department believes that the drop cameras now in use for those sites in deep water are adequate and the high cost of a remotely operated vehicle is not justified, although facilities may choose to use such vehicles. In the interest of avoiding unnecessary monitoring costs, there should be latitude to not require spring videos where there is sound information that they would not add measurably to information about that site. For example, a site with a good operating record, favorable physical characteristics and no problems in the fall video would be a candidate for no spring monitoring. Language has been added to this section in (d) to specify

that the transect be representative of the most significant benthic impacts that are observed. This will provide the most meaningful information from video monitoring, and will be consistent with sediment sampling under section II.E.9. The Department intends that all monitoring and sampling be conducted along the same transect in order to allow direct correlation of various information.

55. Comment: If the FAMP program fulfills video and benthic monitoring requirements as defined in Section II.E, it will enhance the comparability of data among sites. Amend this and other sections to clarify that the monitoring requirements will be satisfied by the FAMP. (18, 19, 62) The DEP reserves the right to require additional sampling and testing if FAMP data are insufficient to determine the cause or remedy to a particular environmental impact. (1)

Response 55: The Department intends to maintain as much consistency as possible between its monitoring requirements and the FAMP. As a condition of general permit coverage, in section I.C.5, facilities must participate in the FAMP. The video monitoring conducted under the FAMP and the requirements of the proposed general permit are very similar. However, changes that may occur in the FAMP during the general permit's term cannot be predicted. As an independent regulatory requirement, pursuant to the Clean Water Act, the general permit must rely on its own terms and conditions and not simply reference other programs. In the event substantial changes are made to the FAMP, the permit may be reopened to consider modifications in order to maintain as much consistency as possible.

Section II.E.9 Sediment and benthic monitoring requirements

56. Comment: Anoxia is a condition rather than a visible feature and can be determined from measurements of surrogate parameters. Remove the anoxia parameter from all monitoring requirements. (2) Anoxic sediment is not defined and is very difficult to measure directly. Enable the FAMP program to fulfill this sampling requirement for consistency. References to anoxia should be changed to "evidence of anoxia" and could then be defined. (19, 62)

Response 56: The primary visual indication of anoxic sediments is unnaturally darkened or black sediments. The section has been amended to note this.

57. Comment: Where it is demonstrated from surrogate sampling that conditions are well within an acceptable range, biological sampling should be reduced to once per permit cycle. Testing done in Canada and by the DMR demonstrates that copper and zinc do not approach toxic levels under pens. Require metals testing similar to the requirements for medicine testing and include provisions to waive testing for facilities demonstrating that metals are not accumulating in the sediments and are not posing a risk and allow the DEP to reduce the testing frequency to once per permit cycle if surrogate testing demonstrates no evidence of organic build-up, *Beggiatoa* or high redox values. (2, 59, 62, 77) Rebuttal comments: Copper and zinc testing results exceeded NOAA Effects Range-Low limits for marine sediment at the Starboard Island farm site. The results may not be at toxic levels, but they are at levels that could have an adverse effect on the benthic community and testing should not be waived. (7) A Normandeau and Battelle report revealed that highly

toxic pollutants including PCBs, dioxins and metals are present in fish feed, but the State has failed to monitor for the presence of these pollutants. (8) Proposal to waive testing is based on the New Brunswick aquaculture industry, of which 30% of all farms will be in non-compliance. Testing for toxicity, copper, zinc and medications should be conducted every year. (9, 81)

Response 57: The Department is in agreement that benthic testing can be reduced with the use of surrogate testing. Tiered monitoring is discussed in more detail below. With regard to copper and zinc, routine testing pursuant to this first NPDES permit is important to obtain a good understanding of existing levels. Given the expectation that these will accumulate at relatively slow rates and are subject to cyclic feeding rates, once per two years is an appropriate sampling frequency. The Department notes that if sites have existing accumulations that are of concern, additional testing and/or discharge control may be required. From the evidence submitted, no detectable concentrations of PCBs have been found at Maine aquaculture sites, and routine testing is not warranted at this time.

58. Comment: Provision of 270 days is too long and not consistent with EPA's Acadia permit. Change the reporting requirement to 60 days. (11, 82)

Response 58: This topic is discussed in response to comment 62.

59. Comment: Monitoring criteria for baseline, near-field, far-field and reference sites are incomplete and inadequate to detect environmental impacts. Require monitoring of nitrate, nitrite, ammonia, sulfides, TOC, total microbial biomass, abundance and diversity, mercury, methyl mercury, arsenic and increase the sampling frequency for these parameters. (9, 60) Mercury bioaccumulates under salmon farms and SLICE is a poisonous experimental drug and should therefore be monitored around net pens. (42) Rebuttal comments: Mercury methylation does not pose a real threat to Maine waters due to the very small size of deposition areas (tens of acres in the entire state). Mercury is monitored through other programs and results of sampling show no significant difference between sites with and without net pens. (2)

Response 59: Only limited, general information is offered on the presence of mercury and arsenic directly connected to aquaculture activities. This does not justify the need to conduct routine testing. The information presented regarding mercury in mussels grown at sites near net pen operations suggests there is not a substantial risk of mercury contamination in the water column. Surrogates such as sulfide and redox will act as adequate indicators of organic material and degradation activity. SLICE is an Investigational New Animal Drug that is currently under review by the FDA, and has been used in Maine under that program in the last two years.

60. Comment: Use a tiered test system involving interpretation of the video mapping dive reports and measurements of basic sediment chemistry. If certain chemistry thresholds are exceeded, further testing (benthic community structure analyses, etc.) should be performed. The key tests of redox, sulfide and toxicity should be conducted on a regular basis. (7, 60, 81) The proposed benthic indicators are narrative, subjective, tedious and expensive.

> Chemical measurements for benthic monitoring offer better sampling and reproducibility for building a hard log of data for the FAMP protocol. Chemical measurements, such as sulfide assays as warning markers, should be considered. (51)

Response 60: The Department agrees tiered sampling is a useful approach that can help to increase the efficiency of monitoring programs. Sulfide testing has been added to the general permit to complement redox tests, and the frequency has, for both tests, been set at twice per year. As with the video monitoring and for the same reasons, a provision has been included to waive the spring testing when all conditions during the preceding fall monitoring are satisfactory. Provided that sulfide and redox measurements remain within acceptable ranges, as defined in section II.G, more detailed and expensive benthic infauna monitoring would not be needed on a routine basis. Conversely, benthic infauna monitoring would be triggered if the warning levels specified in II.G are exceeded, unless the facility can demonstrate that the cause of the exceedence has been identified and corrected. However, in order to track long-term changes in the benthic community, some periodic monitoring is prudent, and the general permit has been modified to require that taxa be monitored at least once during the five-year term of the permit. To ensure that monitoring represents times of greatest possible impact, routine benthic infauna, copper, and zinc monitoring are to be conducted during a year when adult fish, which represent the maximum biomass of any age class, are in the facility's net pen(s).

The Department has also changed the number and location of sampling locations for benthic monitoring. The objective is to as accurately as possible represent the maximum impact of a facility's operations using a standardized approach. Sample site selection depends, in part, on the observations and best professional judgement of the persons taking the samples, taking into consideration local conditions and operations of the facility at the time. Generally, the direction of the prevailing current will have a significant influence on the distribution of settleable material from a facility. Accordingly, a transect line paralleling the direction of major currents in the area and centered on the area have the greatest observed deposition of material or impact is to be used. Because visual observations are both an important monitoring tool in their own right and a means of locating a benthic monitoring transect line, coordination between the two sampling programs is appropriate, and the general permit specifies that all monitoring be conducted concurrently. Along the transect line, sample locations can be established at distances from the nets pens. One location is fixed at the edge of the mixing zone in order to evaluate compliance with water quality standards just outside the mixing zone. Another location is to be selected within the mixing zone at a point where the observed impacts are the greatest. The Department believes that such an approach is preferable to requiring benthic monitoring at arbitrary, predetermined distances from the net pens. At each sampling location, a minimum of three individual samples are to be collected on a line perpendicular to the transect line in order to define the lateral extent of impact at that location. This creates a grid system of sampling locations placed on a transect. As with other monitoring in the general permit, the requirements are a minimum level of monitoring and the Department can require additional testing as needed. To support the analysis of benthic infauna samples, the Department has included sediment grain size and total organic carbon measurements to the monitoring requirements.

The Department believes that benthic infauna tests are a good in-situ indicator of toxicity and that additional toxicity testing is not needed.

61. Comment: Additional monitoring criteria and increased frequency is suggested based on a report that Cobscook Bay is one of five estuaries in Maine with high expressions of nutrient over-enrichment that is expected to worsen in the next 20 years. Among other changes, amend the monitoring requirements to increase the monitoring frequency for sediment and benthic sampling to once per year except that redox and sulfides should be 3 times per year. (9) Benthic monitoring should be every year and include monitoring of copper and other metals of concern in mussels and identification of pollution-sensitive or tolerant taxa. (8)

Response 61: The report on Cobscook Bay and other locations was based on a general workshop including marine experts discussions, but was not a review of actual monitoring results or scientific information that would warrant additional testing at this time. Benthic monitoring requirements and schedules are discussed in preceding responses.

62. Comment: Avoid duplicative monitoring and sampling. There is a lack of Maine laboratories available to perform analysis of samples in a timely manner. (18) Rebuttal comments: The DEP reserves the right to require additional sampling and testing if FAMP data is insufficient to determine the cause or remedy to a particular environmental impact. Out-of-state labs may be used for analyses if in-state availability is low. (1) Samples can be preserved and sent to labs all across North America and the proposed 270-day reporting provision is an excessive amount of time. (7)

Response 62: As the Department has pointed out above, it is important to remain consistent with the FAMP where possible. The FAMP consolidates environmental sampling and monitoring under a single state contract. This provides advantages of more consistency and better quality assurance. It does, however, mean that all work is done by a single contractor and more time must be allowed for final reports to be made since multiple sites and data sets are involved. The general permit does require prompt notification when adverse conditions are identified, providing the opportunity for timely action by the Department. This system provides a reasonable balance between various needs. Since modifying the monitoring requirement to a tiered approach will result in fewer time-consuming benthic infauna analyses, the time for final reports can be reduced from 270 days to 150 days. This will make the benthic monitoring information available prior to spring stocking or monitoring. Other tests are less time consuming and the general permit has been amended to require reporting of those results within 60 days of the sampling event.

63. Comment: A grid system rather than a linear transect will capture variation and provide more meaningful data to regulators and may address data scatter observed in the FAMP. (9)

Response 63: Sample site selection depends, in part, upon the best professional judgement of the person collecting the sample to select areas representative of impacts to the site. This must be done through observations and consideration of site conditions at the times of the sampling event. Narrative requirements for sampling focus on identifying areas of maximum impact. The use of transects has some advantage as they follow prevailing currents and video

monitoring on the same line can be directly compared to benthic sampling locations. As discussed above, collecting three samples at each location on a transect effectively creates a grid system.

Section II.F Reference sites

64. Comment: The proposed siting distance requirement is too close to the net pens to avoid contamination from wastes carried by ocean currents. The minimum siting distance should be 600 meters. Increased separation will reduce the potential for contamination from one farm to another. (9) The proposed 100-meter distance from pens may not be far enough to avoid the "halo" effect of enhanced species abundance and diversity around this organic enrichment zone. The person(s) conducting the sample should determine the appropriate distance. (19, 62) Rebuttal comments: The siting of reference sites should not be left to the discretion of the samplers and the distance should be at least 600 meters from the farms. (9) Reference sites should be 1.5 times the spring tidal excursion from the nearest pen and not less than 100 meters away in the direction perpendicular to the major axis of the ellipse. (11)

Response 64: The Department is in agreement with the general concerns with this section. As the existing language in the general permit discusses, a reference site must be selected to avoid influences from both the facility and other uses of the waters in the area. By moving a reference site too far from the facility, there may be a risk of the physical setting (depth, currents, etc.) not being representative of the facility's location or effects from other uses such as point discharge sources or bottom dragging activities. While this is the goal of the narrative language in the general permit, specifying a distance of approximately 100 meters from the net pens may be too close or restrictive in locating the best reference site. The language has been amended to place the reference site *at least* 100 meters from the pens. Additionally, a provision has been inserted to specify that at least three individual samples be collected to characterize the reference site. In situations where sediment types at the facility site are variable, the Department may request that more than one reference site be established to represent all bottom types present at the facilty. In areas where there are multiple facilities, it may be possible that a single reference site could be found to meet the needs of several facilities.

Section II.G Impact thresholds

65. Comment: DEP allows larger mixing zones for manufacturing and commercial dischargers. There will be no baseline data to compare changes in number of taxa and this restriction should be supported with data or rational. Eliminate enforcement limits, keep existing data collection for indicator species in place, and study proposed metrics in comparison to other criteria before adding enforcement limits. (18, 19) Rebuttal comments: Establishment of mixing zones in accordance with 38 MRSA §451 is rare and has only been done for thermal impacts. (1)

Response: See below

66. Comment: Use of indicator species for marine waters has been helpful, but not proven to be quantitatively useful. Only *Capitella capitata* occurs in all locations and can be used as an indicator. Use the parameters in Tables G1, G2, and G3 as *guidelines* that may then be used in combination with more quantitative criteria to determine unacceptable levels of impact. (18, 19) Rebuttal comments: Retain the proposed impact threshold limits. (11) Removing enforcement limits for indicator species will result in the inequitable and unfair regulation of farms. (9) The warning levels should not simply be used only as a guide; exceeding a warning level should dictate a response. Include measurable and objective criteria in the general permit. (7)

Response: See below

67. Comment: The Board should carefully analyze whether there is an adequate basis for and whether farms can meet the requirement that there be no more than 50% reduction in taxa richness or pollution sensitive species at 30 meters from the nets. DEP has not applied benthic infauna rules to any other marine industry discharger. Eliminate enforcement limits, keep existing data collection for indicator species in place, and study proposed metrics in comparison to other criteria before adding enforcement limits. (18, 19) If any limits are kept, use a single 30-meter impact zone with only warning levels. (62)

Response 65 - 67: As a means of regulating effects within the mixing zone, the Department believes that benthic warning and impact limits are reasonable. Without action limits, the general permit would not be as effective in controlling or correcting adverse impacts. Definitive benthic standards provide objective compliance expectations that are uniform from site to site. In order to simplify the regulatory scheme in the proposed draft general permit, the Department agrees with the suggestions that the two areas within the mixing zone be consolidated into one, and this change and supporting modifications have been made. As discussed in the response to comments for section II.E.9, the Department's intent is that sample locations within the mixing zone be selected to reflect the greatest degree of observed impact.

68. Comment: Care must be taken to develop adverse impact standards that are defensible and enforceable. Impact limits based on "professional judgement" should be avoided as much as possible to reduce subjectivity. All agencies having interest in this matter should pool resources to determine "carrying capacity" for the various bays. Define parameters based on a Before-and-After-Control-Impact (BACI) design that clearly shows a change from baseline and a difference from the reference station; this would be considered a "significant adverse impact." (7, 60)

Response: See below

69. Comment: Imposing numerical criteria beyond what are in the proposed permit is premature considering that the recent adoption of a rule concerning in-stream biological standards was based on over 20 years of research by DEP and others. The narrative standards proposed are adequate and appropriate for the nature of the exposure risk. (2, 59)

Response 68 & 69: The Department agrees that establishment and evaluation of benthic standards is not fully developed as a scientific or regulatory tool. However, the standards in the general permit do clearly define significant adverse effects that would represent unacceptable conditions within the mixing zone. As discussed in the text at the end of section II.G in the permit, the numeric criteria in the permit are only one set of circumstances that would constitute unacceptable conditions. This is especially important for infauna where many combinations of organisms and evaluation techniques are possible. There is presently no substitute for best professional judgement in making comprehensive, informed compliance determinations. The state of analytic, regulatory and scientific information does not allow for a completely objective "formula" that can produce reproducible, definitive evaluation of infauna in all circumstances. Footnote 8 has been modified to clarify that the Department will use generally accepted statistical tests to evaluate compliance with benthic criteria. Given the range and variability of benthic data that may be encountered at a facility, especially for infauna, a single statistical test or predefined confidence level would not be appropriate for all situations.

To support the Before and After, Control and Impact concept, the Department has modified the benthic sampling methods to require replicate samples be collected for each baseline, reference and monitoring site when evaluations for infauna are conducted. This will allow statistical analysis of samples, and language has been added to the general permit to be more specific regarding evaluations of data.

70. Comment: Significant changes as outlined in Table 4 on page 25 of Inka Milewski's direct testimony are recommended for warning and impact levels for the existing and new proposed parameters. (9)

Response: See below

71. Comment: By the time 20% of the bottom is covered, serious environmental damage has already occurred. DEP should post all taxa reductions on a public website. Modify Impact Limit for *Beggiatoa* to no greater than 20%; Patchy Limit to < 20% coverage; and the Anoxic Limit to 20%. (11) Proposed limits for sulfide and *Beggiatoa* are too high. (82)

Response 70 & 71: The concept of a mixing zone acknowledges that some adverse changes may occur within that area. The standards proposed in the general permit are intended to define conditions that clearly demonstrate undesirable changes within the mixing zone. As noted above, other conditions may also constitute unacceptable water quality impacts, as the facility's overall performance is evaluated. However, the Department believes that keeping the numeric limits as proposed is reasonable to define significant changes prompting corrective or compliance actions. With consolidation of two areas within the mixing zone into one 30-meter zone and the addition of sulfide, the Department has modified the warning limits for redox and added warning and impact limits for sulfide. The values used are the same as used by New Brunswick to define hypoxic and anoxic conditions in its aquaculture monitoring program.

Evaluation of *Beggiatoa* coverage and anoxic sediments is more subjective, as these parameters are based on direct observation and review of video monitoring rather than numeric test results. Since these observations will be used for regulatory action points, they should be as definitive

as possible. Accordingly, the Department has replaced the warning level of "patchy" with "≥25% coverage" to be consistent with the presentation of the impact limits. Footnote #3 to the tables has been replaced with a definition of what would constitute anoxic sediments. Since this includes gas formation as one element, that characteristic has been removed as an independent criterion. This will allow a more holistic consideration of conditions that may constitute anoxic sediments.

The numeric limits for *Beggiatoa* coverage and anoxic sediments are a subjective estimate of the degree of impact within the mixing zone. The Department believes that the continued use of the 50% coverage impact limits, as in EPA's Acadia Aquaculture permit, is reasonable. It should be noted that the various parameters, including redox and sulfide, will work in concert rather than as mutually exclusive metrics. Outside the mixing zone, any "compelling evidence" of *Beggiatoa* coverage or anoxic sediments will be indicative of unacceptable water quality impacts.

72. Comment: Section must make clear that exceedances of impact thresholds are violations of the permit. (8, 82)

Response 72: It was the Department's intent in preparing the proposed draft general permit that exceeding the impact limits would constitute a violation of the permit conditions. In section I.A, the general permit already states that a violation of any permit condition is a violation of state law.

73. Comment: Reference sites can be an indicator of impact, but do not account for natural variability in biological species composition. Facilities that exceed the Warning Thresholds in sediment mixing zones should conduct a special study and remedial action. (19, 62) Rebuttal comments: Special studies should be allowed provided that they do not delay remediation actions. (11)

Response 73: The Department agrees with these comments. Facilities covered by the general permit are encouraged to conduct more comprehensive studies to provide additional information about the causes of adverse impacts. The Department will include all monitoring and testing information in any consideration of compliance determinations, necessary corrective actions or further testing needs.

Section II.H Toxic impacts

74. Comment: The terms for toxic impacts are unenforceable unless toxicity testing is added to the permit. (8) Rebuttal comments: The basis for the narrative limitation on toxicity is 38 MRSA §420, which prohibits toxics in toxic amounts. (1) These conditions may be difficult to enforce. (80)

Response 74: The language here parallels that in the statute at 38 MRSA §420(2). In evaluating potential toxicity, the Department will also use Chapter 530.5 of its rules, *Surface Water Toxics Control Program*. In evaluating the risks of or impacts from toxic compounds, it

is the Department's responsibility to correlate those concerns with particular sources of pollutants.

75. Comment: The general permit does not adequately limit the discharge of toxic pollutants and drugs. Farms discharge formaldehyde, anesthetics, antibiotics and feed additives directly to the waters. Testing and monitoring of certain toxic substances may not be required because regulators are not aware of their use. (8, 25, 32, 48, 49) Rebuttal comments: Formalin is not routinely used at salmon farms and small volume bath treatments would provide adequate dilution before discharge to prevent toxicity. (17) Stolt and allied companies have never used formalin at their Maine farms. (16)

Response 75: Despite their frequency, it is the Department's goal to assure that all discharges are protective of water quality. FDA's approval of drugs, including products containing formalin, addresses the evaluation of environmental impacts. The review of NOIs and benthic monitoring results will provide the Department with information to identify potentially toxic constituents of concern on non-target species. Discharges authorized by the general permit are restricted to medications, feed including identified trace chemicals, and incidental losses of disinfectants and other chemicals. Other discharges that would be of concern, such as disinfectants, anesthetics, etc. are not authorized under this general permit.

Section II.I Protection of Atlantic Salmon

76. Comment: These special conditions are redundant and the DEP does not have the expertise to interpret or evaluate genetic or other information. The general permit should simply cross reference the Corps Section 10 permit conditions (62) or add language that causes this section to expire once the Biological Opinion is issued and then default to Corps Section 10. (2, 18, 47) If conditions must be included they should use alternative conditions found in Exhibit AIR-5, which proposes changes in effective dates, audit exemptions, deletion of certain report requirements, and provision for confidentiality. (18) Rebuttal comments: Replacing conditions with default to Corps is irresponsible, illegal and would result in EPA vetoing the permit. Critical issues include non-North American strains, marking and containment. (8, 60)

Response: See below.

77. Comment: The proposed language for protection of Atlantic salmon and its origin are based on the State's anti-degradation law and requirements of NPDES delegation. Escapees from salmon farms pose a threat to wild salmon and pose a threat to habitat for indigenous species. Delegation of the NPDES program included language from the Services' biological opinion. (1)

Response: See below.

78. Comment: General comments were received supporting the elimination of non-North American salmon, the marking of all net pen fish, the development of a CMS, and the reporting of escaped fish. (21, 25, 30, 32, 36, 45, 48, 49, 53, 54, 57)

Response: See below.

79. Comment: The industry cannot survive with the conditions as currently proposed. Under state law the Board must consider economic limitations (as BPT criteria) and should not be bound by federal requirements under the ESA. (62) The consideration of economic factors (as BPT) to protect wild salmon is wrong. Technology based limits and protection of water quality are separate legal considerations. Do not agree with industry's argument that general permit coverage should be granted based on economic concerns. (60)

Response 76 – 79: The basis for including this part in the permit is to protect existing uses of the waters under the State's anti-degradation policy, 38 MRSA §464(4)(F). This was affirmed by the Attorney General's Office during the hearing. See transcript of hearing for February 12, 2003. To document this further, the following is taken from the Attorney General's June 1, 2000, supplemental statement included as part of the State's application for NPDES delegation, pp. 9-12.

> "Any person that discharges a pollutant into waters of the State must obtain a license, prior to commencing the discharge. 38 MRSA § 413. All waste discharge licenses must contain limitations reflecting the federally required application of treatment technologies, as well as any necessary, more stringent limitations required to ensure compliance with water quality standards. 38 MRSA § 414-A, 420, 464 (4).
>
> "As required by the CWA, State water quality standards consist of two components: (1) the designated uses of waters, which include use for public water supplies, habitat for fish and other aquatic life, recreational, industrial and/or other uses; and (2) water quality criteria, consisting of numeric and narrative criteria, which represent the quality of water that supports a particular use. 38 MRSA §§ 465, 465-A, and 465-B; *Bangor Hydro-Electric v BEP*, 595 A.2d 438, 442 (Me. 1991). In addition, the State's antidegradation policy protects existing uses, and maintains and protects the highest water quality being achieved. 38 MRSA § 464 (4) (F) [7].

[7] Pursuant to 38 MRSA § 464 (4) (F), [t]he antidegradation policy of the State is governed by the following provisions.

(1) Existing in-stream water uses and the level of water quality necessary to protect those existing uses must be maintained and protected. Existing in-stream water uses are those uses which have actually occurred on or after November 28, 1975, in or on a water body whether or not the uses are included in the standard for classification of the particular water body.

Determinations of what constitutes an existing in-stream water use on a particular water body must be made on a case-by-case basis by the department. In making its determination of uses to be protected and maintained, the department shall consider designated uses for that water body and:

(a) Aquatic, estuarine and marine life present in the water body;

(b) Wildlife that utilize the water body;

(c) Habitat, including significant wetlands, within a water body supporting existing populations of wildlife or aquatic, estuarine or marine life, or plant life that is maintained by the water body;

(d) The use of the water body for recreation in or on the water, fishing, water supply, or commercial activity that depends directly on the preservation of an existing level of water quality. Use of the water

body to receive or transport waste water discharges is not considered an existing use for purposes of this antidegradation policy; and

(e) Any other evidence that, for divisions (a), (b) and (c), demonstrates their ecological significance because of their role or importance in the functioning of the ecosystem or their rarity and, for division (d), demonstrates its historical or social significance.

(1-A) The department may only issue a waste discharge license pursuant to section 414-A, or approve a water quality certification pursuant to the United States Clean Water Act, Section 401, Public Law 92-500, as amended, when the department finds that:

(a) The existing in-stream use involves use of the water body by a population of plant life, wildlife, or aquatic, estuarine or marine life, or as aquatic, estuarine, marine, wildlife, or plant habitat, and the applicant has demonstrated that the proposed activity would not have a significant impact on the existing use. For purpose of this division, significant impact means:

(i) Impairing the viability of the existing population, including significant impairment to growth and reproduction or an alteration of the habitat which impairs viability of the existing population; or

(b) The existing in-stream use involves use of the water body for recreation in or on the water, fishing, water supply or commercial enterprises that depend directly on the preservation of an existing level of water quality and the applicant has demonstrated that the proposed activity would not result in significant degradation of the existing use.

The department shall determine what constitutes a population of a particular species based upon the degree of geographic and reproductive isolation from other individuals of the same species.

If the department fails to find that the conditions of this subparagraph are met, water quality certification, pursuant to the United States Clean Water Act, Section 401, Public Law 92-500, as amended, is denied.

"One of the mechanisms available for protecting threatened and endangered species is the State's antidegradation requirements, which require that existing in-stream water uses and the level of water quality necessary to protect those uses be maintained and protected. Existing in-stream water uses are defined as those uses which have actually occurred on or after November 28, 1975, in or on a water body, whether or not the uses are included in the standard for classification of the particular water body. *Id.*; 40 CFR 131.3 (e), and 131.12 (a) (1). The determination of what constitutes an existing in-stream use on a particular water body must be made on a case-by-case basis by the DEP. 38 MRSA § 464 (4) (F) (1). In making this decision, the DEP must consider the designated uses for the particular water body, and whether the proposed activity has a significant impact on: (1) aquatic, estuarine and marine life present in the water body; (2) wildlife that utilize the water body; (3) habitat within a water body that support existing populations of wildlife or aquatic, estuarine or marine life, or plant life; (4) actual uses that depend directly on the preservation of an existing level of water quality; and (5) the existing uses' role or importance in the functioning of the ecosystem, or their rarity. *Id*. In addition, the DEP must determine what constitutes a population of a particular species based upon, *inter alia,* the degree of geographic or reproductive isolation from other individuals of the same species. 38 MRSA § 464 (4) (F) (1-A) (b). The DEP may only issue a waste discharge license pursuant to § 414-A if it finds that the applicant has demonstrated that the proposed activity would not have a significant impact on the existing use. 38 MRSA § 464 (4) (F) (1-A) (a).

"Thus, as required by the CWA, the State's antidegradation law provides the DEP with sufficient authority to protect, on a case-by-case basis, aquatic, estuarine and marine

life, wildlife that utilize waters of the State, habitat, including significant wetlands, and plant life that is maintained by a particular water body. 38 MRSA § 464 (4) (F) (1) and (1-A). In doing so, the DEP must use factors such as the degree of geographic and reproductive isolation of a particular species, and determine that the proposed activity will not "impair[] the viability of the existing population, including significant impairment to growth and reproduction or an alteration of the habitat which impairs viability of the existing population." 38 MRSA § 464 (4) (F) (1-A)."

To carry out this responsibility, the Department has consulted with the Services and EPA and believes that it has the benefit of not only its own knowledge but the expertise of those agencies. The best practicable treatment requirements in state law (including consideration of economic limitations) are applicable to technology based effluent standards. They do not apply to conditions necessary to protect existing use of the receiving waters.

The Department cannot meet its obligations under State water quality law and the Clean Water Act by including a provision that adopts the provisions of a yet to be issued Army Corps permit. To do so would unconstitutionally delegate the Department's regulatory authority to another agency, in this case the U.S. Army Corps of Engineers. Nonetheless, the Department is concerned that regulatory requirements of different agencies not conflict. In anticipation of future Corps permit conditions protecting wild Atlantic salmon, the Department has included a reopener provision in the general permit for consideration of such conditions as appropriate.

Section II.I.1 Phase out of non-North American salmon

80. Comment: The industry cannot comply with the 7/31/03 deadline. This requirement is a reversal of policy on broodstock development and a 1999 letter from the Dept. of Commerce to then Governor King. The proposed schedule will force companies to slaughter Maine strain stocks. The permit should allow facilities to continue with current stock to F2 generation broodstock. The proposed 2003 and 2006 deadlines should be extended to 2007 and 2010, respectively. (15, 18) Rebuttal comments: Allow companies adequate time to create and then screen F2 cross generation, which will allow for last of fish that have not been screened to be harvested from the water in 2010. The majority of fish in net pens in 2009 would be progeny of broodstock screened under the Protocol. (15, 62) Assertion that the 1999 Services' letter allowed for continued use of European salmon is false. The letter stated that it did not oppose use of European salmon if elimination of escapement is being achieved, which is not the case. Assertion that salmon farms should be able to add four years to the proposed deadline is an economic argument that should be disregarded in its entirety. (8) Rebuttal comments: The 1999 letter from the Department of Commerce to Gov. King actually stated that non-North American stock could be used if "elimination of escapement was being achieved," which is clearly not the case. The Services position that non-North American strains pose a threat to wild salmon is long-standing. The proposed phase-out schedule would not cause a mass slaughtering of fish, rather it prevents additional spawning of non-North American salmon and subsequent stocking of their progeny while allowing the grow-out of millions of non-North American fish already in production. (50) The industry proposal for phase out is too long and amounts to a selective breeding program rather than elimination of traits. (60)

Response: See below

81. Comment: Several persons commented on the proposed language based on the Services' recommendations. Establish a schedule of compliance for the phase-in of North American strains as set forth in Aquaculture Industry Rebuttal Exhibit 5, that proposes increases the effective date of certain requirements, the reporting of testing protocol results, confirmation of protocol testing and other changes. It is not possible to determine if stocks are aboriginal or not and no data were presented to support the gene diversity claims. Clarification by the EPA of the legal rational for inclusion of ESA language reveals that the Services have no authority under the ESA to dictate wild salmon protection to the BEP. (31)

Response: See below

82. Comment: DPS sub-populations of Atlantic salmon arose from non-native imported fish. Migration of fish is of limited importance as the fish are not of aboriginal runs and may actually improve genetic variability. Salmon that have escaped from Maine farms should be similar in genetic history to wild salmon inhabiting DPS rivers. (15) Rebuttal comments: Selectively breeding salmon to eliminate the variable maturation schedules characteristic of wild salmon is beneficial for farming, but poor for the wild. Further, farmed salmon can cause outbreeding depression in native populations. Reproductive success of a farm salmon is less than wild salmon. The assertion that European genes should not be expected to have a negative effect is not consistent with European studies. The National Academy of Sciences concluded that the genetic evidence supported the existence of the DPS. (12)

Response: See below

83. Comments: The Services submitted several comments in response to testimony from Dr. Graham Gall, University of California. They disagree with claims that there is no scientific evidence that the immigration of European genes should be expected to have had a negative impact on North American subpopulations and that addition of farmed salmon genetic material to wild spawning subpopulations may provide a genetic boost and have a positive impact on the viability of the local subpopulations. NASCO members have agreed that European salmon should not be raised in net pens in North America. Salmon from Maine farms are not similar in genetic history to wild salmon and have been subjected to intense domestication. The proposed breeding plan which claims to eliminate all non-North American stock by 2010 only hides the genetic fingerprints that the testing procedure uses to identify non-North American stock and does not actually eliminate the stock. Published studies indicate that farmed fish drastically decrease the fitness of wild salmon. (50)

Response: See below

84. Comment: Order a risk assessment of hybrids vs. North American stocks to determine the least risk stock to the DPS and long-term success of recovery efforts. Allow the CMS to

operate for 5 years with annual reviews. Require hatchery level marks during this time. (55)

Response 80 - 84: To protect wild Atlantic salmon as an existing use of the waters of the State, the genetic composition of commercially-reared fish is a factor that must be considered. The 1999 letter from the Department of Interior to Governor King must, as the Services point out in their February 10, 2003 letter, be considered along with more recent information regarding the control of escaped fish. The information offered in this matter indicates that the absolute numbers of both escaped and wild salmon recovered in rivers are small. However, commercial fish are a considerable percentage of the total number. Viewed on this basis, and to the extent different genetic composition between commercial and wild fish may affect restoration efforts, the risk from genetically different commercial fish may be substantial. Some testimony asserted that wild salmon would not be harmed by or might even benefit from interbreeding with commercial fish. However, the majority of the testimony did not concur and stated there are unique and identifiable differences in the genetic composition of fish of North American or non-North American (European) origin. If interaction between the strains were to occur, wild salmon could be adversely affected. This testimony is consistent with comments received from the Services. Accordingly, measures to phase out non-North American fish from aquaculture facilities appear to be appropriate.

The Microsatellite Analysis in Appendix A of the general permit is intended to be a genetic benchmark for future breeding programs. It is also the means to monitor the success of breeding programs in maintaining the genetic integrity of broodstock. The Department shares concerns raised with regard to proposed cross breeding of non-North American and North American fish. Such selective breeding may circumvent the intent of any screening test to determine if a fish is, indeed, a North American strain. Although, the testimony did not establish the probability of this actually occurring, this is a risk raised in the comments that cannot categorically be dismissed. To provide the greatest degree of confidence, the test is best used as a one-time measure to define breeding lines for future generations. The Department has added language that would prohibit cross breeding or “back breeding” between non-North American and North American strains. Once tested as one strain or the other, a fish could be bred only with another fish of the same strain when being used to produce eggs that will be hatch into fish that will be placed in net pens.

The Department realizes that various facilities that may seek coverage under the general permit are presently in different positions with respect to the genetic composition of their broodstocks, and insufficient testing has been done to fully characterize them. Broodstock, fish or gametes (eggs and sperm) may be available for purchase by facilities that cannot meet their needs within their own or related corporations. However, the number and genetic quality of these outside sources has not been established.

Upon issuance of the general permit, some facilities may not be able to immediately meet the conditions pertaining to genetic strains of fish, or requirements for marking of fish as discussed under section II.I.4. These conditions constitute new water quality based requirements and, pursuant to 38 MRSA §414-A(2), the Department may establish a schedule of compliance within the terms and conditions of the general permit. Despite the various positions the different facilities are in, each should be afforded a reasonable opportunity to move forward expeditiously

to come into full compliance with these new standards. When using such compliance schedules, interim measures are commonly used to reduce risks until full attainment of water quality standards can be achieved.

The transition to North American stock depends in part on the life cycle of the Atlantic salmon. The Department believes that some facilities will be able to move to North American strains within the next breeding cycle since their existing broodstocks or accessible gametes reportedly will meet the criteria in Appendix A. The general permit has been revised in subsections II.I.1.e-f to describe the time needed to removed all non-North American fish from the net pens through one breeding and grow-out cycle. This time schedule is similar to that in the proposed general permit, although the date for stocking North American fish into net pens, formerly in subsection (a), has been placed in a separate subsection and adjusted from July 31, 2003 to July 31, 2004.

Other facilities may not be able to meet this timetable and, for those situations, an Alternate Compliance Plan (ACP) has been added as subsections (g) and (h). In order to gain coverage under this extended schedule, a facility will need to demonstrate that, in the short-term, its broodstock will not comply with Appendix A and that enough acceptable gametes cannot be purchased. To come into full compliance, one option would be for a facility to develop a new broodstock line through two generations of breeding. While a sound long-term management plan, this is a lengthy process that, in the interim, would pose a continuing risk to wild Atlantic salmon. Another alternative is to meet production needs on an annual basis by making use of existing North American stock through a combination of outside sources and/or selective use of North American stock the facility may currently have in its own broodstock.

To obtain an ACP, a facility must file an initial request as described in the new subsection (g), by February 1, 2004, for the Department's approval. The ACP would not be available to new facilities. Genetic screening of existing broodstock, a search for outside sources of North American fish or gametes, production needs and a management plan are the foundation the ACP request. The ACP is based on the assumption that existing facilities will take all possible steps to reduce the number of non-North American fish placed or remaining in net pens to minimize the potential risk to wild salmon. One element of this is to keep stocking levels, as a combination of both strains, to that which has been stocked in the past five years. Another is for the facility to make every effort to locate sources of North American strains on an ongoing basis.

The ACP is based on an assumption that a combination of a facility's existing North American stock and/or purchases from outside sources is the most timely route to eliminate the use of non-North American fish. In either case, the record does not fully document the adequacy of supplies of gametes or fish to fill production needs in a specific timeframe. The amount of time that may be needed under an ACP depends on several factors. The genetic composition of a facility's own broodstock is a first consideration, since if sufficient North American stock is available, development of that line could be a preferable course of action for a facility to pursue. Purchase from third parties would depend on the quantity, quality and availability of gametes or fish on an open market. A facility will need to first secure a willing seller, either by annual "spot market" purchases or contracts to meet needs in future years. Any purchases from outside sources would, of course, need to be of acceptable quality as defined by Appendix A. Additionally, the facility will also consider its own quality standards for growth rate and other production related criteria.

Finally, the quantity of acceptable gametes or fish may influence how quickly an ACP can be completed. Purchases are subject to third parties making available sufficient numbers to meet a facility's production needs in future years. Factors such as outbreaks of disease or wintertime broodstock losses can also influence the number of fish available in future years.

In consideration of these uncertainties, the ACP sets as an outside deadline of July 31, 2006 for the placement of only North American fish in net pens. This represents a three-year extension from the timetable for facilities not requiring an ACP, and the Department believes this is a reasonable maximum time a facility may require to manage the various factors described above. However, the Department is hopeful that as ACPs are developed and more information becomes available, facilities will be able to more forward more expeditiously. The Department is fully committed to working with the facilities, the Services and other parties to accomplish this goal.

As described in the new subsection (h), to maintain coverage under an ACP, a facility must conduct genetic screening and annually report to the Department on efforts to obtain North American stock to meet production needs for the ensuing year, activities during the past year and future management plans.

Section II.I.2 Transgenic fish

85. Comment: The prohibition on transgenic salmon is absolute and permanent with no opportunity to accommodate new information. Transgenic salmon have not been approved for sale or use worldwide and cannot be sold or used until FDA approved. Sterile trangenics cannot transmit novel genes to wild fish or produce the juveniles that could displace wild fish and would not be expected to alter or disrupt aquatic ecosystems. Amend the general permit so that there is no prohibition on transgenic salmon or so that any prohibition is made conditional on a credible jeopardy finding by the Services based on the outcome of a formal, scientific risk assessment. Create a new section which allows the Department to accept an application to place non-reproductively viable, non-North American or transgenic salmonids in net pens provided the applicant demonstrates that the proposed introduction will not result in increased jeopardy to Atlantic salmon. (66)

Response: See below.

86. Comment: Prohibit the use of genetically altered salmon in fish farming with no exceptions. (12, 22, 41, 42, 86)

Response 85 & 86: No changes have been made to this section. Potential risks to the "existing use" of wild Atlantic salmon from the use of transgenic fish are not fully known. Presently, the FDA has not approved the use of transgenics for human consumption. If, subsequent to the issuance of the general permit, the FDA approves the use of transgenic salmon, and more information becomes available, the permit can be reopened to reconsider allowing this use.

Section II.I.4 Fish marking

87. Comment: Four categories of fish marks were described: 1) Tags which cause abrasions, lesions and increased mortality, are not consumer-friendly and require FDA approval; 2) Mutilations which increase the risk of infection and may adversely affect growth; 3) Dietary additives which adversely affect husbandry and marketability; and 4) Physiological discriminators which can be used to determine river vs. hatchery origin with high confidence. Only DNA-typing has no effect on growth, survival or marketability. (13) Rebuttal comments: Fish tagged for scientific reporting or management do not have significantly different concerns than those which are commercially grown. Coded wire tags (CWTs) do not adversely affect the survival, behavior or growth of salmon. CWTs are inserted into non-edible parts of the fish and are therefore not a problem with regard to consumption. Neither consumers nor the FDA have objected to this practice despite the insertion of CWTs into millions of Pacific salmon eaten by consumers over many years. (5)

Response: See below.

88. Comment: There were comments on the implementation schedule for fish marking. For the majority of tag/mark categories, the impact on growth, survival and/or marketability has not been studied when applied on a commercial production scale. There is a lack of data on industry-specific identification techniques to determine whether they would be effective or economically feasible. Allow sufficient time to conduct field trials and otherwise develop a thorough analysis of the standards to be applied in determining best practicable practices. (1, 79) Amend section to eliminate requirement for facility-specific marks by 7/1/05. Eliminate the 1/1/04 hatchery-specific deadline and provide a reasonable timeframe for marking trials throughout a full production cycle. (18) Site specific marks should be implemented without delay. (82)

Response: See below.

89. Comment: There was a concern on the effectiveness of a fish marking requirement. The proposed marking requirements provide incentive for extremists to steal and plant marked fish in DPS rivers. The marking requirement for site-specific marks is neither technically feasible nor economically justified considering the small number of escapees in Maine. A Maine origin/hatchery-specific mark is feasible. Require that all marking materials be FDA approved for food fish, revise the audit requirement to scheduled audits in spring and fall and after significant events as per Section II.I.6.a and allow revisions to run the 5-year term, then review. (55)

Response: See below.

90. Comment: It is unclear if the FDA will approve of the use of CWTs and it is not possible to mandate the use of CWTs until they are FDA approved. (31)

91. Comment: DMR has a written report concluding that objectives of the Services could be met with a hatchery-specific mark, when combined with containment audit protocols. (13)

Response: See below.

92. Comment: Several studies have shown no significant effects on the overall survival, growth or behavior of healthy fish that have been marked with coded wire tags. Tagging is no more stressful than other handling procedures like sorting or weighing. The cost of manually tagging fish is about $0.09/fish, including tags, depreciation of equipment and labor. Tagging costs for Maine would be about $0.115/fish. A new automated system can do the job at a reduced cost of 20% below manual. (5)

Response: See below.

93. Comment: Site-specific marking is not economically feasible and applying CWTs as suggested is too stressful on fish. Grading and sorting in hatcheries is a major logistical problem. Studies are ongoing to evaluate marking methods. Hatchery-level marks are more practical and provide essentially the same information. The requirements for site-specific marks should be dropped and additional time be allowed for hatchery-level marks to be implemented. (62) Fin clipping applied during warm weather may endanger fish health and is not suitable to meet short-term US industry goals. (81)

Response: See below.

94. Comment: A tagging/marking program can only be effective to achieve recapture of escaped fish if 100% of salmon entering Maine's rivers are examined, which requires that all rivers have collection facilities. Some rivers do not have collection facilities while others are ineffective at peak salmon runs. Therefore, even before a hatchery-specific tag (the most effective type identified) can be operationally or economically feasible, a system must be in place to ensure that every fish could be captured and checked for marks. (13) Rebuttal comments: A March 2001 Army Corps workshop identified CWTs as a technology and technique that satisfies the needs of fisheries managers and the US industry, and the automated tagging units are already available. Otolith marking is currently available, feasible and adequate for fish screening. (50)

Response: See below.

95. Comment: With regard to fish escapement, amend this section to provide that discovery of an escaped farm salmon shall trigger an audit of the facility it escaped from. (8) Language specifying that an audit shall be conducted if "a" commercially reared fish is found is interpreted as one audit performed for each fish found. (i.e. Does the discovery of 120 farm fish in Maine rivers equate to 120 separate audits?) (55)

Response 87 - 95: Based on the testimony received, the Department believes the complexity and risks to fish do not appear to justify site-specific marking at this time, given the incremental benefit that may be gained. For the short-term, identification of fish to the hatchery level will provide a reasonable level of specificity when attempting to trace the origin of an escaped fish. As some of the testimony pointed out, containment and audit systems are essential for preventing escapes. Marking serves to help identify facilities where containment systems may need improvement, and an escaped fish can trigger an audit of the suspect facility. A one to one

relationship between an escaped fish and a specific facility would be ideal. However, the problems associated with implementing and carrying out site-specific marks must be weighed against other more feasible alternatives available for development at this time. Marking a fish at the hatchery level, taken with facility stocking records and the age of the fish, will allow narrowing of possible facilities from which it may have escaped to only a few. Audits can then be conducted at all of those locations. The Department notes that methods such as otolith marking and DNA identification have promise as being able to identify the hatchery of origin with minimal or no risk to fish health or growth (trials on otolith marking are presently underway). These may be able to identify lots within a hatchery, providing a further level of gradation without marking individual fish.

In many cases, the company that owns a net pen facility also owns or is related to the hatchery in which the fish are raised. However, common corporate ownership is not always the case. When fish are transferred from a hatchery owned by one company to a facility owned by another, a hatchery level mark may lead to confusion and misdirected audits or corrective action in the event a fish escapes. To ensure that an escaped fish can be linked to the company owning the net pen facility from which it was lost, the Department has added another level of marking to identify fish at the company level if needed. This appears as new subsections (e) and (f) in the revised general permit, and consists, respectively, of a proposal for Department approval and implementation of the approved plan.

However, the need for site-specific marking in the future cannot be dismissed and should be retained for implementation in the future as necessary and practicable. To help address some of the questions raised in the testimony, more study is needed. Concurrently, efforts to restore wild Atlantic salmon are continuing and trials of site-specific marking, notably coded wire tags, are underway. The effectiveness of containment and audit systems has not yet been demonstrated. Accordingly, the Department believes that site-specific marks must be pursued for future implementation. The general permit has been amended to allow completion of site-specific marking trials and preparation of a report to the Department. This is a revision of the former subsection (d) that now appears as a new subsection (g). The Department will use the report to determine if site specific marking remains justified in light of the information gathered through the studies. In doing so, the Department will consider the findings of the report, the effectiveness of containment and audit systems, hatchery level marking systems and the status of Atlantic salmon recovery efforts. As alternatives, the Department may opt to reopen this general permit to consider new information or to reconsider the matter as part of the renewal of the permit.

With regard to triggering audits, the language in II.I.4.a has been amended to allow exclusion of facilities having little probability of being the source of escaped fish. The Department, in consultation with the Atlantic Salmon Commission and the Services, will consider the specificity of a hatchery or other level mark, age of the fish and other factors in making determinations of what facility audits are necessary. Similarly, the Department may need to use its enforcement discretion in deciding when the recovery of escaped fish will require audits. The number, frequency and patterns of recovered fish will be considered. The history and findings of audits in the time preceding the recovery of fish and reported escapes will also be factors. For example, fish of the same size/age recovered following the reported loss at a single

facility coupled with recent audits at other facilities may be sufficient information to conclude the source.

With regard to a mark to identify fish as having been socked in Maine waters, as discussed in section II.I.4.b, the date originally proposed has now passed and some adjustment is required. Handling fish in order to apply marks such as fin clips or tags is problematic at certain times of the year. To allow a reasonable time frame for implementation of this level of marking without incurring undue risks for disease or mortality, the Department has adjusted the compliance date to April 1, 2004. This is intended to ensure that fish stocked into net pens in the spring of 2004 will be marked as to their Maine origin.

Section II.I.4.c Hatchery level marking

96. Comment: This section requires that all hatcheries have a unique mark. If somebody is involved in the industry but does not own a hatchery, whose responsibility is it to certify that the hatchery providing the fish has the required mark? If the mark is in violation, does the entity receiving the fish have legal responsibility? This is a permit for net pens, not hatcheries and this requirement does not belong in a permit for net pen aquaculture. (55)

Response 96: The aquaculture facility is the entity regulated by the general permit. The means to comply with the general permit – in this case the type of mark – is left to the individual facility. A number of methods would be acceptable and two separate marks may be used if a facility has concerns about the proper identification of the source of escaped fish where the hatchery is owned by a company other than the owner of the net pens.

The Department has added a new subsection (c) to the general permit to require a report on proposed hatchery level marking methods be submitted by September 1, 2003. This will allow review of proposed methods prior to the fall breeding season in the event that the methods may depend on genetic screening of broodstock or otolith marking. The former subsection (c) is now (d) and the compliance date has been adjusted to July 31, 2004; the study language has been moved to (c).

97. Comment: The industry states that the majority of losses are not attributable to general practices, but to site-specific issues. Feedback on containment practices is greatly enhanced as the mark becomes more specific from US industry to hatchery to site-specific. (50)

Response 97: The Department generally agrees with this comment. The marking of fish is intended to provide information on the effectiveness of containment and auditing systems.

Section II.I.4.d Submission of report to identify fish

98. Comment: The requirement to submit a report is commercially and economically disastrous. Fish having a unique mark are handled by outside contractors away from the farm. Marked fish that die during transport could not be replaced with my unique mark. Fish that could not be accepted for some reason could not be sold to another farm due to the unique mark. This method is burdensome, expensive, impractical and inefficient. (55)

Response 98: This report is discussed in response to comments for section II.I.4, above. Whether marking to the hatchery or site-specific level, procedures will need to be worked out among the hatcheries and net pen facilities within the industry. The permit sets goals and leaves as much latitude as possible for individual arrangements and solutions.

Section II.I.6 Containment Management System

99. Comment: Specify that a violation of the facility's CMS is a violation of the permit. (8)

Response 99: Section I.A stipulates that violating any condition of the general permit would be a violation of state law. This would include not having or following an approved CMS. Since the contents of the system itself may be subjective and tailored to the needs of an individual site, there is no single objective standard for all facilities. In reviewing individual systems, the Department will need to determine if they are appropriate for the location, and if procedures are being followed and documented.

100. Comment: Modify the requirement so that CMS audit reports are sent to DMR rather than DEP and specify that these and standing inventory reports be considered confidential. (18)

Response 100: As with all information required by the general permit, the direct reporting obligation is to the DEP. The Department's laws allow confidentiality for certain materials. DEP and DMR are prepared to work together to share information through a unified reporting system to avoid duplicative state reporting.

101. Comment: It is critically important that each facility use the standardized CMS developed by the stakeholder group. (12)

Response 101: The Department agrees with this comment to the extent that a standard format can be adapted to the needs and procedures of individual facilities. Since one date in subsection 6(d) has now passed and other language in that subsection is similar to the intent of 6(a), subsection 6(d) has been dropped in favor of modifications to 6(a).

102. Comment: CMS plans are technical and should be designed by an engineer. (38)

Response 102: The Department does not believe this is necessary. Several professional groups may be qualified to do a good job, and there are persons who specialize in this type of work. Section II.N addresses the qualifications of persons performing monitoring or reporting under the general permit.

Section II.I.7 Reporting of escaped fish

103. Comment: Amend this section to require reporting of all known escapes and discovery of conditions that are likely to lead to escapes, such as holes in nets. (8)

Response 103: The present reporting level was set in consultation with the Services, the Atlantic Salmon Commission and other agencies. The escape of 50 or more adult fish is the level that would trigger immediate action on the part of these agencies. All incidents of escape or conditions that may lead to escapes are to be recorded in facility containment management systems, allowing the Department or other agencies to evaluate the facility's efforts to prevent escapes. All losses must be reported to DMR on regular inventory reports.

Section II.J.1 Removal of dead fish

104. Comment: Some persons suggested that dead fish be removed from pens on a daily basis in order to reduce the spread of diseases. Diseases may threaten the lobster industry if not controlled. It was noted that Corps permits now require this. (8, 30, 40, 53, 54, 57, 82) Conversely, it was noted that daily removal of carcasses would cause increased stress in fish in pens, creating another risk factor for disease. Weekly removal is sufficient, although some common sense must be used to take into consideration weather related delays in the removal of dead fish. (17, 62) Finally, one facility operator stated dead fish are normally removed on a twice per week basis. (18)

Response 104: As a minimum performance standard, the Department believes that weekly removal of dead fish from net pens is reasonable under normal conditions. It is important to note that agencies having jurisdiction over fish health issues may require more frequent removal as they deem necessary to control diseases at particular times and locations. The general permit has been amended to acknowledge that a prolonged a period of adverse weather may preclude safe removal of fish.

Section II.J.3 Use of chemicals

105. Comment: The proposed language on allowing only incidental discharges is vague and should be more specific. (8) However, common sense must be used for the incidental spills of disinfectants and BMPs should be referenced. (17)

Response 105: The fundamental method of spill and or incidental discharge prevention is implementation of effective management plans appropriate for each compound and its use. To support this, the Department has added language to specify that facilities should maintain best management practices for the handling of compounds they use. The intent of this section is to avoid direct discharges of compounds/chemicals due to overuse, spent baths, leaks, spillage, etc.

Section II.J.5 Net cleaning

106. Comment: Concerns with on-site net washing were raised, noting that such practices may result in unacceptable deposition of solids on the sea floor. The language should be clarified to prevent these problems. (11, 42) Others thought that the language was overly stringent and did not relate to acceptable standards. The language should be changed to allow mechanical net cleaning under a management plan, provided that the activity does not cause the benthic criteria to be exceeded. (18, 62) Finally, the language was thought to be

satisfactory and management plans are not needed given the narrative standards in the general permit. (2)

Response 106: The use of mechanical net cleaning may be one means of reducing the use of anti-fouling chemicals. Done properly and frequently enough, net cleaning need not result in unacceptable deposition on the sea floor. The general permit does require development of best management plans for mechanical net cleaning practices. The language has been amended to include a reference to the benthic standards in section II.G as a measure of acceptable performance.

Section II.J.7 Separation of nets from the sea floor

107. Comment: The Department clarified its intent that the 3-meter separation include all nets, not just predator nets as specified in the proposed general permit. (1) Others stated that net separation does not equate to improved benthic conditions. Some sites with less than the required separation are in good compliance, but would be excluded from the general permit if this criterion is included. Shallow sites can perform as well as deep ones. The net separation should be limited to new sites or eliminated altogether. (16, 18, 19, 62, 76, 81)

Response 107: As with other factors such as current velocity, net separation is one consideration in aquaculture farming that may contribute to successful operation of a facility. While some locations may have acceptable performance in shallow waters, individual reviews are prudent to determine if additional operating or monitoring requirements may be needed. In site-specific reviews, the Department may consider stocking density, feeding rates, current velocities and physical site characteristics. In all circumstances, net separation to allow safe diver access for monitoring of benthic conditions remains a concern for the Department.

Section II.J.9 Reporting of unusual events

108. Comment: The requirement for when to report fish kills as unusual events is not well defined. It was suggested that a suitable standard is if the weekly mortality exceeds 150% of the preceding four week average. (17)

Response 108: The Department agrees that the language would benefit from clarification in this area and has incorporated this suggestion.

Section II.K Husbandry practices

109. Comment: The need to fallow sites between year classes was an issue for several persons as this allows time for a site to recover from impacts. Some suggest mandatory fallowing times and clarification that no overlap of year classes be allowed. Stocking density and biosecurity measures are related to maintaining satisfactory site conditions. The language should be clarified to address overlap between year classes. (8, 21, 30, 36, 45, 53, 54, 57, 58, 60) A fallowing period should be specifically defined or related to fish health program standards. (17) Finally, it was pointed out that this section is a cross reference to and relies on DMR fish health programs. (2)

Response 109: Control of diseases is a major benefit of year class separation. However, the are also direct benefits in terms of reduced benthic loadings on a sustained basis and simplified monitoring programs. The period of fallowing is best left to fish health experts and facility managers who consider not only fish health, but benthic impacts in determining the appropriate fallow period. The Department expects facilities to be in compliance with benthic standards at all times and views fallowing as a preventative measure rather than a remedial one. Section II.G more directly addresses these problems by requiring facility-specific corrective action plans at the time impacts are detected.

Comments did point out that carryover of broodstock fish is not addressed in the general permit. This practice involves a relatively small number of fish and maintaining them would not be expected to pose significant environmental risks. The general permit has been amended to allow the carryover of broodstock, provided that these fish do not exceed 10% of the number of production fish that may be at the facility. The Department notes this permit condition is not intended to supercede more stringent restrictions that may be imposed by fish health agencies to control the spread of disease.

The Department has modified the narrative conditions in II.G to state that new fish should not be placed in net pens until an action plan has satisfactorily addressed the cause of lowered benthic conditions.

Section II.L BMPs for disease control

110. Comment: At a minimum, the general permit should require bay-level planning for fish health and seek to include those provisions in the industry's own finfish bay management agreement. Studies have shown that separation of sites by at least 5 km reduces the risk of disease spread. (12) The importance of site separation was questioned, noting that Maine's disease control program is stronger than in other places. (2)

Response: See below.

111. Comment: The general permit does not adequately minimize the spread of disease and parasites, and allowing the spread of disease violates water quality standards. (8) On rebuttal, it was noted that these points are overly broad and are not supported by scientific information. Fish are handled carefully and pest management programs are in place to control parasites. (17)

Response 110 & 111: The Department recognizes the importance of collective efforts to protect the health of both farmed and wild fish. Other agencies, such as DMR, the Maine Department of Agriculture and USDA, are more deeply involved in and have greater expertise with fish health than the Department. Accordingly, it is most appropriate to allow these agencies to implement disease control measures under their regulatory authority. If specific disease management plans were included in the general permit, changes made by other agencies could cause inconsistencies with and would require modifications to the general permit. The primary purpose of this section of the general permit is to ensure that drugs used by the aquaculture facilities do not cause

adverse effects or toxic impacts to the receiving water. This section has been renamed, "Use of Drugs for Disease Control" to more clearly reflect the intent of this section.

112. Comment: Several parties were concerned that conditions in the permit would restrict a veterinarian's ability to treat diseases and would usurp their professional judgment. The regulation of drugs and their use should be left to FDA programs and systems. The permit need only specify that FDA approved drugs may be used with a veterinarian's prescription. (3, 18, 23, 46, 64, 65) On rebuttal, it was noted that testing of water or sediments can be done to determine if drugs are causing impacts. Aquaculture managers withhold the use of medications prior to marketing fish, so concerns with the need for immediate disease control may be overstated. There were also concerns raised about possible effects on other species, such as lobster larvae. (7, 8, 40)

Response 112: It is not the Department's intent to interfere with a veterinarian's professional judgement or ability to treat diseases in a timely manner. Indeed, control of diseases is a common goal of all parties in this matter. However, aquaculture facilities discharge drugs directly into the waters of the State, and the Department must be concerned with possible effects on organisms in those waters. This section is intended to assure that drugs are used safely and within the guidelines of FDA approvals for each product. The Department's primary interest is to be informed of uses not fully approved by FDA in order to review possible water quality effects in those situations.

Section II.L.1 Use of FDA approved drugs

113. Comment: The phrase "only drugs approved by the FDA for finfish aquaculture may be discharged" is excessively restricting to veterinarians and reduces their options. (33)

Response: See below.

114. Comment: There were comments on the prophylactic use of approved drugs. Some facilities do not use drugs in this manner. (18) If a drug is FDA approved, its use need not be further restricted if FDA regulations are followed. (35, 85) Conversely, it was suggested that prophylactic use should be prohibited or allowed only as part of an overall plan to reduce the use of chemicals. (8)

Response 113 & 114: The Department does not intend to contradict or interfere with the use of drugs that have been approved by the FDA. In approving drugs, FDA considers environmental as well as health impacts and this information is publicly available. The listing of drugs on a NOI provides adequate disclosure for approved uses specified on the product label. The Department encourages facilities to include in their NOIs all approved drugs they may use over the term of general permit coverage. In light of the changes being made to section II.L.2 described below, discussion of the use of drugs not listed in the NOI has been deleted from this section. With regard to the prophylactic use of drugs, the requirement for Department approval has also been deleted. The FDA approval should be adequate to address adverse effects for the term the drug is administered. The Department understands that none of the drugs presently approved for aquaculture facilities are labeled for prophylactic use.

Section II.L.2 Extra-label use of drugs

115. Comment: The extra-label use of drugs should be left wholly to veterinarians who must respond to and accept responsibility for treatment of disease. The time for DEP approval of these uses is not defined and could be an impediment to proper treatment. (3, 33, 85)

Response 115: The Department appreciates the concerns raised about the ability of veterinarians to use drugs in extra label applications as they see fit in a timely manner. As suggested above, the Department's chief concern is that uses not fully investigated by FDA not have unintended adverse effects on aquatic life or uses. This section has been rewritten to allow extra label use of approved drugs as needed, with notice to the Department as soon as possible. This notice would preferably be made prior to the use, but if time does not allow, after the treatment begins. If the use is to continue for more than 30 days, or may be repeated in the future, an amended NOI must be filed by with the Department. In this manner, a definite process and timeline is created for review and approval of extra label drug use and the public is informed of continuing or repeated uses. If information submitted indicates that an extra label use may cause serious environmental impacts, language has been added to allow the Department to address these risks by limiting the use of these drugs.

Section II.L.3 Use of Investigational New Animal Drugs

116. Comment: The procedures for approval of INAD drugs is not clear. (3, 33) The authority for and scope of DEP review is not substantiated. (35) It was also noted that lobsters and other organisms are harvested from adjacent areas and monitoring should be performed to protect human health. (8) The requirement for environmental monitoring should be deleted and the Department should rely on FDA information. (85)

Response 116: Considerations for the use of INADs are similar to other drugs, except that information on aquatic toxicity may not be well documented and further studies may be needed. This may be especially true if there are local conditions or concerns, such as impacts on lobsters, which need to be evaluated. Practically, the Department will view the use of INAD to be experimental in nature and will review proposals on their scientific merit and likelihood of meeting water quality standards. The scope and duration of approved uses will be limited by the Department to that needed to control specified outbreaks of diseases and collect information to demonstrate the drug's efficacy and safety, consistent with the nature of the use and investigations for the particular compound. Reports of INAD use and studies would typically be required. The use of an INAD could be pre-approved based on need and the results of preliminary study results. This is preferable to an initial long-term approval since changes to use rates, further studies, etc. can be incorporated more effectively. Because of FDA confidentiality restrictions, environmental data held by that agency would not necessarily available to the Department.

Section II.L.5 Placement of drug use signs

117. Comment: The requirement that warning signs be posted when drugs are in use caused a concern that veterinarian-client confidentiality would be violated. (33, 46, 85) Notification is appropriate since fish cages are not closed systems and are in the open water. (8) There are public notification provisions for the use of antibiotics only under DMR laws, although there is a concern that the time for posting signs be clarified in the permit. (2)

Response 117: When drugs are discharged into public waters, it is the Department's responsibility to ensure that the public is aware of such use. Individuals can than make personal choices about their use of the waters on an informed basis. For this reason, the signage requirement has been retained.

Section II.M BMPs for spill control

118. Comment: There should be a limit on the time allowed for reporting spills, consistent with oil hazardous material program requirements. (11)

Response: See below.

119. Comment: The requirement that spills sufficient to cause certain impact must be reported to the Department and the National Response Center is inadequate and all spills should be reported in this manner. The wording should be changed to ensure consistency with other programs. (38)

Response 118 & 119: The reporting requirements of the general permit are not intended to supercede those of any other regulatory program. If a spill event triggers reporting requirements under other laws or regulations, those notifications must be made. If another DEP program is notified, that will suffice for notice to the Department under the general permit. NPDES program rules require 24 hour notice of non-compliance followed by written notice within five days.

Appendix A Microsatellite analysis

120. Comment: The procedures specified in the protocol could not be replicated in independent labs. For DNA assignments, relying on a single lab that may not be available in the future to evaluate test results is a flawed system. Laboratory capacity, estimated costs and timeliness of readings for genotyping results during the spawning season, which is only three to four weeks, have not yet been determined. The systems are not in place to handle the tremendous load that would be required for review of genetic data by a single federal laboratory on behalf of the entire industry. (18) This position was contested by the Services who believe the protocol produces reproducible results and that, with proper scheduling, the lab capacity and turn-around time should not be an issue. (50) The website reference is incorrect. (79)

Response 120: This procedure is new and thus not thoroughly tested in full-scale use. However, the Department believes that DNA testing is a well-established technique that has the potential to provide a reliable and accurate measure of permit compliance. As the test is placed into full

scale for the aquaculture industry, all parties must work to address implementation issues as they may arise. The website reference has been changed. The Department has removed language about supplementing the database used for reference, as more information becomes available. This will avoid the possibility of creating a "moving target" for compliance in the future. Finally, the use of a three-loci test has been deleted as that was intended to apply only to fish bred in 2002, and the seven-loci standard must be met n the future.

Parties Providing Comment on the Proposed Draft General Permit

Group I: Intervenor comments through Direct, Rebuttal and Oral Testimony
* Specifies parties who provided both oral and written testimony

Key	Party
1*	Dennis Merrill and Lee Doggett, Department of Environmental Protection
2*	John Sowles and Andrew Fisk, Department of Marine Resources
3*	Donald Hoenig, DVM, State Veterinarian, Department of Agriculture
4*	Christopher Spruce, Sunrise County Economic Development Council, Town of Lubec and City of Eastport
5*	H. Lee Blankenship, Northwest Marine Technology
6*	Norman Famous, Roque Island Gardner Homestead Corporation
7*	Robert Gerber, Certified Geologist, P.E.
8*	Joshua Kratka, National Environmental Law Center
9*	Inka Milewski, Conservation Council, New Brunswick, Canada
10	Vivian Newman, Maine Serria Club
11*	Neil Pettigrew, Assoc. Professor of Oceanography, Univ. of Maine
12*	Fred Whoriskey, Atlantic Salmon Federation
13*	John Bailey, Heritage Salmon, Ltd.
14*	Sebastian Belle, Maine Aquaculture Association
15*	Graham Gall, Professor, Univ. of California, Davis
16*	Mark Kesselring, Stolt Sea Farms
17*	Peter Merrill, DVM, Micro Technologies, Richmond
18*	David Peterson, Atlantic Salmon of Maine, LLC
19*	J.E. Rensel, Aquatic and Fisheries Scientist
20	Christopher Frantsi, Heritage Salmon

Group II: Comments from non-intervenor parties through Written and Oral Testimony
* Specifies parties who provided both oral and written testimony

21	John Allen, Michael W. Huber, Cynthia Simon, Linda VonMerta, Amy Hansen, Jessica Lavin, Laura Paise, Scott Warner, Patricia Bredenberg, Jessica Lavin, John Pehek, Matt Prindiville, Terry Bunch, Janis Burton, James Houghton, Robin Rabens, Noam Rettig, Jan Collins, Natalie Doel, Ellen Rowan, Ron Salkin, Caryl Everett, Renee Gannon
22	Nancy Allen, by e-mail
23	Bruce Little, DVM, American Veterinary Medical Assoc.
24	Siri Beckman, Stonington
25	Tom and Dee Benn, Whitefield
26	Paul Bodurtha, Camden
27	B. Brown, by e-mail
28	Karen Burke, Terscott
29	Louise Burne, Sedgwick
30	Heather Cameron, Portland

31	David Peterson, representing Atlantic Salmon of Maine, LLC, Stolt Sea Farm, Inc., Treat's Island Fisheries, Inc., Island Aquaculture Company, Inc., D.E. Salmon, Inc., International Aqua Food USA, Inc.
32	Heather Curtis, Portland
33*	Leighanne Hawkins, DVM, Eastern Maine Veterinary Association
34	Linda Murphy, US EPA, Boston, MA
35	Stephen Sundlof, US FDA, Rockville, MD
36	Catherine Groell, by e-mail
37	Paul Groell, Fairfield, CT
38	Norman Laberge, Trescott
39	Bobbie Lehigh, Eastport
40	Sally Littlefield, Brooksville
41	Walter Loring, Perry
42*	Jane McCloskey, East Penobscot Bay Environmental Alliance
43	Renata Moise, by e-mail
44	Linda and Jim Monore, Blue Hill
45	Jacqueline Morlaw, Portland
46*	Mary Sheridan, DVM and William Bryant, DVM, Maine Veterinarian Medical Association
47	Stephen Page, Searmont
48	Elizabeth Parker, Camden
49	E.D Pimental, Clinton
50	Michael Bartlett, US Fish and Wildlife Service and Mary Colligan, National Marine Fisheries Service
51	William Shaw, Sunset
52	Jody Spear, Harborside
53	Heather Sultz, Dennysville
54	Philip and Janice Sultz, Dennysville
55*	Erick Swanson, Trumpet Island Salmon Farm, Inc
56	Tonya Troiani, via e-mail
57	Bill and Marilyn Voorhies
58	Barbara Witham, Lamoine

Group III: Non-intervenor comments through Oral Testimony

63	Chris Heinig, Marine Biologist, MER Consultants
64	Paul Waterstrat, DVM, Department of Marine Resources
65	David Scarfe, DVM, American Veterinary Medical Association
66	Joseph McGonigle, Aqua Bounty Farms
67	Marston Brewer, Stonington Fisherman
68	William Shaw, Coastal Resident
69	Sonny Pierce, Pierce Associates, Inc.
70	Julie Keen Hodgkins, Commercial Fisher
71	Jacob Vandysandy, Coastal Resident
72	Maggie Vandysandy, Coastal Resident
73	Sharon Burke, Coastal Resident

Group IV: Intervenor comments through Post-hearing and Reply Briefs

59	John Sowles and Andrew Fisk, for Department of Marine Resources
60	Sean Mahoney, for Environmental Organizations
61	James Kilbreth, for Roque Island Gardner Homestead Corporation
62	Elizabeth Butler, for Aquaculture Industry

Group V. Persons commenting on the proposed permit of May 9, 2003

74	Jeff Thaler, representing Atlantic Salmon of Maine
75	Nick Brown, UM Center for Cooperative Aquaculture Research
76	Sean Mahoney, representing Friend of Blue Hill Bay, Roque Island Trust, East Penobscot Bay Environmental Alliance and Elizabeth Butler, representing Stolt Sea Farms, Heritage Salmon, Atlantic Salmon of Maine
77	John Sowles and Andrew Fisk, Maine Department of Marine Resources
78	Chris Heinig, MER Assessment Corp.
79	Nicholas Nadzo, representing Heritage Salmon
80	Dr. Donald Hoenig, Maine Department of Agriculture
81	Elizabeth Butler, representing: Stolt sea Farms, Atlantic Salmon of Maine, Maine Aquaculture Assoc.
82	David Nicholas, National Environmental Law Center
83	Sean Mahoney, representing Friend of Blue Hill Bay, Roque Island Gardner Homestead Corp., East Penobscot Bay Environmental Alliance
84	Erick Swanson, Trumpet Island Salmon Farm
85	Dr. Bruce Little, American Veterinary Medical Assoc., Dr. Mary Sheridan, Maine Veterinary Medical Assoc., Dr. Leighanne Hawkins, Eastern Aquaculture Veterinary Association
86	Bill & Marilyn Voorhies, West Tremont

Alphabetical Listing of Acronyms Used in Response to Comments

BEP- Board of Environmental Protection

BPT- Best Practicable Treatment

Corps- United States Army Corps of Engineers

CMS- Containment Management System

CWA- Clean Water Act

CWT- Coded Wire Tag

CZM- Coastal Zone Management

DMR- Maine Department of Marine Resources

DO- Dissolved Oxygen

DPS- Distinct Population Segment

ECHO- Enforcement and Compliance History Online

EPA- United States Environmental Protection Agency

ESA- Endangered Species Act

FAMP-Finfish Aquaculture Monitoring Program

FCR- Food Conversion Ratio

FDA- United States Food and Drug Administration

GOMOOS- Gulf of Maine Ocean Observation System

INAD-Investigational New Animal Drug

MEPDES- Maine Pollutant Discharge Elimination System

NASCO- North Atlantic Salmon Conservation Organization

NEPA-National Environmental Policy Act

NOAA- National Ocean and Atmospheric Administration

NOI- Notice of Intent

NPDES- National Pollutant Discharge Elimination System

Services- the National Marine Fisheries Service and the US Fish and Wildlife Services

SLICE- Sea Lice (Emamectin benzoate treatment)

TOC- Total Organic Carbon

USDA- United States Department of Agriculture